COASTAL POLLUTION

(101-68)

HEARINGS

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES

OF THE

COMMITTEE ON
PUBLIC WORKS AND TRANSPORTATION
HOUSE OF REPRESENTATIVES

ONE HUNDRED FIRST CONGRESS

SECOND SESSION

MAY 9, 10, 1990

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COASTAL POLLUTION

WEDNESDAY, MAY 9, 1990

House of Representatives,
Subcommittee on Water Resources,
Committee on Public Works and Transportation,
Washington, DC.

The subcommittee met, pursuant to call, at 10 a.m., in room 2167, Rayburn House Office Building, Hon. Henry Nowak [chairman of the subcommittee] presiding.

Mr. Nowak. The subcommittee will come to order.

This morning the Subcommittee on Water Resources meets to receive testimony on issues relating to coastal pollution.

The coastal environment provides an important habitat for fish and wildlife. Economically, coastal waters are valuable not only because of the fisheries they produce, but also because of the tourism, real estate, industrial water supply and transportation linkages they support as well. Coastal U.S. waters are worth billions of dollars to this country. According to EPA, approximately 87 percent of the dollar values of U.S. finfish harvests nationally are species whole life cycles depend entirely or in part on near coastal water habitat, including the Great Lakes. At the same time, roughly 70 percent of the U.S. population lives within 50 miles of a coastline, including the Great Lakes, and that number is growing.

Pollution to coastal waters comes from an array of sources including industrial and municipal sewage treatment plant discharges, urban and rural nonpoint source runoff, stormwater and combined sewer overflow drains, and atmospheric deposition. EPA reports that cumulatively, the pollutants from these sources have degraded the coastal environment by damaging critical habitats, contaminating fish with toxins, and posing risks to public health.

Coast pollution has been addressed in several laws—the Federal Water Pollution Control Act, the Ocean Dumping Act, the Ocean Dumping Ban Act, and the Coastal Zone Management Act all address certain causes of and responses to coastal pollution. The subcommittee will review the effectiveness of these laws, possible amendments to these laws and new legislation if it appears to be needed.

Today we will focus on the significance of pollution of coastal waters compared to pollution of other surface waters. The subcommittee will hear testimony on the relative importance of the various sources of contamination and the effectiveness of current and proposed protection and restoration measures.

I am pleased to have testifying before us today one of our colleagues who has been a leader in bringing national attention to the problems confronting our coast environment—Congressman Gerry Studds of Massachusetts. He has worked tirelessly on trying to devise constructive solutions to coastal pollution problems.

We also have testifying today representatives of the federal agencies involved in coastal research and restoration efforts and a representative of New York State's coastal program. We look forward to hearing about their work as well.

Before we begin with our first witness, I yield to my distinguished colleague from Minnesota, the ranking Republican Member of the subcommittee, Arlan Stangeland, for whatever opening remarks he wishes to make.

Mr. **STANGELAND**. Thank you, Mr. Chairman. Today and tomorrow the subcommittee meets to receive testimony on coastal pollution. We will get a close look at the current situation and some of the proposed solutions.

Coastal pollution is a national problem. Each of us, whether we live in the northern plains or the southwest or on the coast itself, should be concerned. In fact, 75 to 80 percent of the nation's population will soon live within 50 miles of the shore. We all have a lot at stake in protecting our nation's coastal and Great Lakes water resources—probably now more than ever before given the evidence of increasing pollutants and populations.

The Office of Technology Assessment, OTA, highlighted the problem and outlined suggested solutions in a 1987 report. Our committee, along with the Merchant Marine and Fisheries Committee, requested this exhaustive study. OTA found our coastal and estuarine waters to be in declining health. They also recommended options including improved implementation of the Clean Water Act and Ocean Dumping Act and establishment of additional controls on point source and nonpoint source pollution.

Today, we explore those findings and suggestions as well as current efforts underway at EPA, NOAA, and the Fish and Wildlife Service. Such background information will help us to analyze some of the far-reaching legislative proposals now pending before our committee.

Mr. Chairman, I commend you for holding today's hearing. Our committee will need to examine thoroughly any comprehensive strategy involving, among other things, the Clean Water Act, the Ocean Dumping Act, coastal zones, estuaries, wetlands, point source and nonpoint source pollution, and activities of EPA and the corps.

I look forward to receiving our witnesses' testimony and continuing to work with you on this vital environmental issue.

I welcome our colleague, Mr. Studds, who is certainly in the forefront of leadership in this effort.

Mr. **NOWAK**. Thank you, very much.

I want to acknowledge John Paul Hammerschmidt, our minority leader on the full committee and a very interested member of this subcommittee in this material.

Let me now turn to our first witness, as I mentioned in my testimony, someone whose efforts have been outstanding in this area and have moved, I think, the national program to where it is today and hopefully we will be making some progress in the near future. Congressman Studds.

TESTIMONY OF HON. GERRY STUDDS, A REPRESENTATIVE IN CONGRESS FROM MASSACHUSETTS

Mr. STUDDS. Thank you very much, Mr. Chairman.

I apologize for the brief delay. I took the Metro to work and that turned out to be a miscalculation and a serious problem.

Thank you for allowing me back. I served on this committee many years ago, too many, I think. It is a pleasure to be here. I want to commend you and your subcommittee for the work that you have done and point out that at this point the opportunity I think that we have to work together to do some more. I appreciate your scheduling these hearing on coastal pollution, a subject that is as near and dear to my heart as it is to my front yard.

On the chance that anyone in the room is confused about what Cape Code has in common with Buffalo, or why I am here at the table—let me remind you that "coastal," in the odd vocabulary of Washington, DC, includes the freshwater expanse along the middle part of our nation's northern boundary, as well as our saltwater shorelines. Under that definition, coastal pollution directly affects the lives of one-half of the population of our country.

Mr. Chairman, I do not need to detail for the members of the subcommittee the scope and seriousness of the coastal pollution problem. You are experts and leaders in water pollution control law. And most of you represent districts that border on the ocean or Great Lakes. So I will be very brief.

Three years ago, the Office of Technology Assessment concluded that our coastal waters are degrading steadily, and that they will continue to deteriorate under existing programs and existing laws, even if those programs are fully funded—which they are not; and even if every industrial firm and sewage treatment plant complies with those laws—which they do not.

The causes of coastal pollution, and the reasons for our failure to control it, are well known. Exploding population growth, discharges from both point and nonpoint sources, over-burdened local governments, lack of effective regulation, lack of effective research and monitoring, and an ocean of federal red ink that would make Lake Michigan look like the Tidal Basin, in comparison.

As you know, Mr. Chairman, our Subcommittee on Fisheries and the Environment began a series of hearings on this subject shortly after the OTA report was released in 1987 and continuing through this past spring. Last June, we introduced, H.R. 2647, the Coast Defense Initiative—or CDI. Last month, that bill was approved by the Committee on Merchant Marine and Fisheries. Today, I ask your help and urge your subcommittee to act.

What would CDI do? What does it say?

First, it says that the best way to decide how to restore coastal waters is for the states to tailor specific approaches to specific problems by working through the water quality standards program. CDI would beef up that program by requiring EPA to do the technical work that still needs doing in the area of water quality criteria, by requiring states to get their standards onto the books, and by requiring that they stick to them.

Second, CDI would enlist state coastal zone management programs in the battle against coastal pollution. When state and local officials decide how much pollution must be abated and who should do what to reach that goal, CDI provides that state coastal authorities will be there to help if necessary. This additional tool will be particularly helpful in getting at nonpoint source pollution.

Third, CDI would establish a monitoring program for coastal waters that will tell us where the problems are, what the remedial programs ought to look like, and whether the efforts we have put in place in the past are doing what we thought they would. This provision is consistent with the findings of a report that is about to be released by the National Academy of Sciences and which characterizes current coastal pollution monitoring efforts as inadequate, ineffective and over-priced.

Finally, CDI would establish a fee to be assessed against industries discharging pollutants into coastal waters that would raise about $90 million a year. When combined with fines, penalties and other transfers, CDI would make about $160 million available each year, primarily for state and local pollution control efforts.

Mr. Chairman, in closing, let me say that I welcome these hearings as much as I would welcome your help. I believe that CDI is a good bill. More than a dozen members have contributed to its provisions, and invaluable technical assistance was provided by the state of New York. The bill has bipartisan, bi-coastal, multi-state, inter-committee, House-Senate support. It also has a very catchy name, is largely self-financing, and if not substantively perfect, I am confident that—with your help—it can be perfected.

Unfortunately, time is beginning to grow short for action in this Congress; and in the battle against coastal pollution—whether in Buffalo or Buzzards Bay—time is not on our side.

Accordingly, I urge the subcommittee to act and act soon. Together, I believe we can make great progress. And I look forward to your help.

Let me observe, as one final point, Mr. Chairman, that this bill, as you may know, did something really quite remarkable in our committee. It is a bill of considerable substance and complexity. It passed our committee on a unanimous bipartisan vote without objection of any kind. Usually, when that happens you can be sure there is not a lot of substance in the matter.

In my years here I don't think I can remember any measure that gained such support.

Thank you for allowing me to meet with you.

Mr. **Nowak**. The basic bill, I think we have a chance to look at. One of the things that was brought up is that there are existing programs. The question really comes down to, do we need more than those existing programs? Do we need a new initiative? Do we need a combination of both? As we look at the program, I think that the most telling reason for looking at a broader initiative is that the Office of Technology Assessment report, which you referenced on the first page of your testimony, states that even if the existing programs are fully funded and even if every firm and treatment plant would be in compliance, we would still have very substantial problems.

Those problems are cumulative and those problems will be growing. I wonder if that could be considered as the driving force after you moved on your review of that technology report. Do you think that the initiative proposed is answering some of the questions in that report?

Mr. STUDDS. It is our impression that we are very much thinking along the same lines. I think the findings of that report underscore, as you suggested, precisely what our hearings have shown over the last couple of years.

Mr. NOWAK. Thank you, very much.

Let me turn to Mr. Stangeland for any comments or questions.

Mr. STANGELAND. Thank you, Mr. Chairman.

Just a comment and maybe you will want to comment on it. From your opening statement, Gerry, and I am not real familiar with what CDI does but from your opening statement I gather what you are trying to do here is primarily place responsibility on the states coastal zone management people, local people more or less as opposed to a federal mandate providing them the revenue to get the job done.

Can you give us an estimate of what amount of money could be responsibly utilized to attack the problem. I say "responsibly" because I am wondering about the $1.8 million figure. I would like you to describe how CDI will assess that. How will that work briefly?

Mr. STUDDS. You are precisely right with respect to acknowledging the principal decision making and regulating is going to have to be at the state level. I think we are beyond the day when we can look to this city, especially given the unability and unwillingness of the Federal Government to match its dictates with dollars, that realistically speaking we are going to have to look to ways to strengthen state programs, water quality, coastal management and others.

The guesstimate of $150 or $160 million that this might raise, as you know that would not get the capital construction costs of sewerage treatments around the country. I think your committee has documented that is in the billions of dollars. We are thinking of $90 million from effluent fees, against those who discharge industrial discharges, those who are permitted to discharge into our waters, some $5 million in fines and penalties and also to divert some from OCS receipts.

We have worked with Ways and Means on this. This may or may not turn out to be shared jurisdiction, that is for the parliamentarian to say. They look as we understand it very kindly at what we are trying to do. Some have raised questions as to whether we ought to look at a larger order of magnitude for the construction costs they will face.

But that is not addressed in the bill as it is now.

Mr. STANGELAND. I appreciate that. I can understand there is no way that funding is going to adequately cover the waste water discharges, the cost to upgrade Boston is horrendous. Just as an aside, I believe it was a scientist from MIT who came here and testified about a technology that they are trying to implement up in Massachusetts for a chemical treatment that would replace the secondary treatment facilities.

According to their estimates, and they cannot prove this is going to work yet, as I gather for Boston at least, but if it can work for

Boston, I forget the figure for building the plant but it is horrendous.

But the cost of the chemical treatment would be about $1 million a year. I wonder if you are familiar with those technologies because of your interest and knowledge in the field. Sometimes I think government tends to do things the way we have done them for 30 years and stands in the way of new technologies that can probably solve our problem at a much less care.

Do you care to comment?

Mr. STUDDS. I can wish with you. We have a pilot project in Cape Cod for my constituency which may or may not be the one to which you are referring. We are hoping to cut costs and benefit the environment. I think all of us all the time would be looking at those things with our fingers crossed.

Mr. STANGELAND. I appreciate that. Thank you very much.

Mr. NOWAK. Ms. Molinari, do you have any comments you would like to make?

Ms. MOLINARI. Thank you, Mr. Chairman.

One quick question because obviously I have a lot of briefing that I have to go through and please forgive my lack of information with regard to this particular initiative.

If I understand correctly, this legislation that you propose would create a certain amount of revenue for this program based on fines and permitting fees.

Mr. STUDDS. That is correct.

Ms. MOLINARI. I see under the briefing that you give us, 30 percent of that fund would be redistributed to the states. Would there be any formula that would guarantee that perhaps those states or coastal areas hardest hit by industrial discharge would receive their fair allocation back? How do you redistribute that money?

Mr. STUDDS. Our current thinking and this is subject to change both in your committee and later on, that of the $190 million raised from the fees, about $21 million would go to the municipalities themselves, the remainder would be distributed like this. Thirty percent to state water quality agency, 30 percent to coastal zone management agency, 20 percent to the monitoring program this bill would seek to establish, and 20 percent reserved to EPA and to NOAA for their work in connection with this effort.

Ms. MOLINARI. With that first caveat, the first area that would be receiving it, the annual grants to the coastal states that are taking part in the fund, I am reading that you are taking into account the shoreline and the states' efforts to implement the program and other factors.

Would that factor be areas hardest hit, public beaches prone to fishing and wildlife activity, is that the formula?

Mr. STUDDS. I believe it does track the formula for the fund under the coastal zone management program which takes that into account. The state of New York does extremely well under that program.

Ms. MOLINARI. That is extremely important. Thank you.

Mr. NOWAK. Thank you very much, Mr. Studds. We will be back to you as we make progress here.

Mr. STUDDS. I look forward to it.

[Charts referred to by Mr. Studds appear on pp. 195–96.]

TESTIMONY OF ROBERT H. WAYLAND III, DEPUTY ASSISTANT ADMINISTRATOR FOR WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY TUDOR T. DAVIES, DIRECTOR, OFFICE OF MARINE AND ESTUARINE PROGRAM; CONLEY MOFFETT, ACTING DEPUTY ASSISTANT DIRECTOR FOR FISH AND WILDLIFE ENHANCEMENT, U.S. FISH AND WILDLIFE SERVICE; AND JOHN CAREY, DEPUTY ASSISTANT ADMINISTRATOR, NATIONAL OCEAN SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ACCOMPANIED BY DR. ANDREW ROBERTSON, DIRECTOR, COASTAL ENVIRONMENTAL QUALITY MONITORING PROGRAM, OFFICE OF OCEANOGRAPHY AND MARINE ASSESSMENT, AND KATHRYN COUSINS, NORTH ATLANTIC REGIONAL MANAGER FOR COASTAL MANAGEMENT PROGRAMS, OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT

Mr. **Nowak**. We now want to bring to the table a panel of federal agencies who have been involved in this area. The first would be the Environmental Protection Agency, Robert H. Wayland, III, Deputy Assistant Administrator for Water and he will be accompanied by Tudor Davies, Director of Office of Marine and Estuarine Program. Also from the U.S. Fish and Wildlife Service Conley Moffet, who is the Acting Deputy Assistant Director for Fish and Wildlife Enhancement. From the National Oceanic and Atmospheric Administration, John Carey, Deputy Assistant Administrator, National Ocean Service.

Gentlemen, thank you for coming and thank you in advance for your prepared testimony. We will, of course, make your written testimony a part of the record. I would like to hear now from Mr. Wayland.

Mr. **Wayland**. Good morning. I am Robert Wayland, Deputy Assistant Administrator for Water, the U.S. Environmental Protection Agency. I am accompanied by Tudor Davies, Director of the Office of Marine and Estuarine Protection. We are pleased to appear before this committee today to speak to you about the problems of coastal pollution and what the agency is doing to address these issues.

I will abbreviate my statement in the interest of time. We are pleased to be here today to talk about the problems of coastal pollution and what the agency is doing to address these issues.

Under the Clean Water Act the agency's mission is to protect and restore all of the nation's waters, including wetlands. Our base programs, including the setting of water quality criteria and standards, monitoring, permitting, enforcement, and nonpoint source pollution control, are working to achieve that goal.

One area receiving more and more attention from EPA and other agencies is our coastal and marine waters. The Office of Technology Assessment's 1987 Report on Wastes in the Marine Environment found that our coastal waters are in "deep trouble" and require immediate attention to prevent further degradation and to restore these waters to good health. The solutions to these problems are complex as many of their causes are land-based and are primarily due to the population growth and development occurring in our coastal zone. At the same time, these coastal waters receive pollutants coming down our rivers. With the majority of our nation's population now living within an hour's drive of our coasts, including the Great Lakes, the urgency of addressing these problems is compelling.

The agency has responded to these problems by developing a National Coastal and Marine Policy which is a consolidated statement of the agency's goals and objectives for improving coastal and marine environments. The policy is responsive to the public's concerns about protecting human health and aquatic living resources, and serves as the agency's framework for action.

The policy's goals and objectives focus on recreational uses of our beaches and shoreline, pollution controls to ensure protection of living resources and their habitats, pollution prevention, watershed and development management in cooperation with NOAA's Coastal Zone Management program and local and state agencies, improved coastal science, and international efforts. In order to accomplish these goals, emphasis is placed on building partnerships among federal agencies, state and local governments, interest groups and the public.

We are currently in the process of developing a Federal Coastal and Marine Policy by working closely with several agencies including the Department of the Interior, the Coast Guard, the Department of Energy, NOAA, the Department of Agriculture, the Corps of Engineers, and the Department of Justice.

Some of EPA's programs already build on the philosophy underlying our policy. The National Estuary Program uses regional, state and local capabilities to address coastal problems in 17 estuaries and demonstrates various approaches that may be applied to estuaries and coastal water bodies nationwide. In particular, the programs emphasize the importance of building grassroots understanding and support for protecting our coastal resources and of encouraging individuals to take the responsibility for pollution and modifying their lifestyles. This "bottom up" process of collaborative problem-solving builds the political and public will to support and pay for environmental protection. We feel it is time to apply the consensus building approaches developed in this program to our expanded Near Coastal Waters program.

The Near Coastal Waters program represents EPA's commitment to address broader coastal issues and to strengthen the use of our existing regulatory authorities. The program builds on lessons learned in the NEP and other coastal programs, develops new management and technology transfer techniques, and provides for the flexibility needed to tailor protection and management efforts to the needs of other coastal waters.

I would now like to make a number of points that are important in considering the legislative proposals put forward to address coastal pollution issues.

First, the Clean Water Act and Marine Protection, Research, and Sanctuaries Act are basically sound statutes that provide EPA, states and localities with adequate authorities for addressing most traditional marine and coastal causes of pollution, such as industrial and municipal wastewater treatment facilities. Technology-based controls are generally in place for these facilities, and our basic strategy is to focus on more stringent controls where needed to protect water quality standard, especially for toxic pollutants.

Second, any new provisions affecting our programs should be designed to fill gaps in the protection and restoration of coastal waters, including wetlands and other aquatic habitats. They should consider geographic targeting of activities to valuable coastal areas that already exhibit significant water quality problems or waters that are threatened and in need of protection. In these areas, baseline controls are not yet in place for non-traditional sources of pollution, such as nonpoint sources, combined sewer overflows, stormwater discharges and certain habitat modifications. Our immediate concern in these areas should be to implement specific, available and practical controls for the nontraditional sources causing the most serious impacts, while maintaining the current levels of controls on traditional sources, to provide a fairly consistent baseline of controls in these areas.

Third, problems vary—region by region and waterbody by waterbody. Any coastal legislation must allow sufficient flexibility for Federal, State, and local authorities to design and implement cost-effective solutions to particular regional and local problems.

Fourth, protecting our coastal resources will not be an easy task nor will it be inexpensive. Any new responsibility should be matched by the resources needed to carry it out.

I emphasize these points because they are fundamental to our analysis of all of the related proposed legislation. It is important that any new legislation not disrupt ongoing prevention, implementation, or clean-up efforts. However, there are other areas where "business as usual" is not sufficient and the tools to combat these problems needs to be sharpened.

In conclusion, the National Coastal and Marine Policy establishes the framework for the agency to address coastal problems and is now being implemented through the geographically targeted coastal programs, the National Estuary and the Near Coastal Waters Program. In addition, current efforts are underway in the base programs to focus on critical coastal problems and areas where additional and more stringent controls are needed. Using both of these approaches, we hope to continue to make progress against the problems affecting our coastal waters.

Mr. Chairman, this concludes my statement. I would be happy to answer any questions that the subcommittee may have and provide technical assistance in your review of the coastal legislation under consideration by your committee.

Mr. Nowak. Very good. Thank you. We will go through the panel's testimony and we will come back because there will be some questions, I am sure, that will be inter-related.

Mr. Moffett from the U.S. Fish and Wildlife.

Mr. Moffett. Thank you.

I, too, will give you a brief summary of my testimony as submitted to you.

As you know, the mission of the Fish and Wildlife Service is to "conserve, protect, and enhance fish and wildlife and their habitats." Our trust resources include lands that we manage—such as the National Wildlife Refuge System, comprising more than 89 million acres—migratory birds, certain endangered species and their critical habitats, anadromous and certain Great Lakes fishes, and some marine mammals. We also have the responsibility to administer the 1982 Coastal Barriers Resources Act, which is aimed at conserving nearshore habitat for coastal resources. As a result of these trust responsibilities, we are involved in water quality issues that may affect freshwater and coastal fish and wildlife and their associated habitats. At the start, I would like to point out that, except for anadromous fish and migratory birds, our responsibilities lie primarily inland of the coastline and include coastal watersheds, while NOAA is responsible for marine fish and mammals found seaward of the coastline.

In addition to a clear legislative mandate for this involvement, the Service has a long history of leadership in coastal resource management. Over the years many Service efforts have focused on coastal resource issues including: pioneering work on the effects of environmental contaminants on migratory birds including brown pelicans, osprey, bald eagles, and peregrine falcons; serving as the lead agency for preparation of the National Estuary Study during the 1960's; involvement in reviewing state coastal zone management plans prior to their approval; preparing the national wetlands inventory and other coastal habitat mapping activities; and, more recently, investigating the decline of Atlantic coastal striped bass and participating in EPA's national estuary program.

The Service's mission relative to polluting activities is "to prevent, and when necessary, mitigate the adverse impacts of environmental pollution on the Nation's fish and wildlife and resources and their habitats." Unfortunately, there is no shortage of problems. According to EPA, sewage treatment plants discharge 9.5 billion gallons of treated effluent directly into our estuaries and nearshore waters ever day, and industrial and commercial facilities discharge an additional 3.2 billion gallons of effluent daily. It has been estimated that nonpoint sources may be responsible for up to 50 percent of the contaminants input into coastal waters.

As a result, chemical contamination of coastal and surface waters and bottom sediments is widespread. Thirty-eight States, including 16 coastal States, have issued consumption advisories due to contamination of fish, and at least two Great Lakes States have issued consumption advisories for waterfowl. Nationwide, populations of waterfowl and many recreational and commercial fisheries are declining. Resource problems due to contaminants are known or suspected on approximately 40 percent of our 477 National Wildlife Refuges.

Among the Federal agencies, the Fish and Wildlife Service has significant capabilities and expertise to respond to coastal pollution problems. These include a network of 160 coastal national wildlife refuges, fishery assistance offices that deal with anadromous and interjurisdictional fisheries, and 31 coastal fish and wildlife enhancement field offices. These field offices review permit applications and Federal projects, analyze the effects of proposed activities on endangered species, evaluate State nonpoint source management plans, and identify, assess, and mitigate contaminant impacts on fish and wildlife.

The Service also has seven research centers that have a significant coastal resource orientation and is responsible for the national wetlands inventory and several site-specific programs. These regional activities include the Alaska Marine and Coastal Bird project, a major Great Lakes effort, the Chesapeake Bay Program, and smaller efforts in the northeast estuaries, the Connecticut River, Delaware Bay, Albemarle-Pamlico Sound, Galveston Bay, San Francisco Bay, the Columbia River estuary, and Puget Sound.

As a result of these efforts and those of other Federal and State agencies and universities, the body of information documenting the impacts of coastal pollution on fish and wildlife is growing. Our National Contaminant Bio-monitoring Program has confirmed that, while levels of many contaminants are declining, unacceptably high levels of some constituents continue to adversely affect fish and wildlife. Polychlorinated Biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), Organchloride pesticides, and certain metals are of particular concern due to their ubiquitous nature; their propensity to accumulate in fish, mammals, and birds; and their effect on fish and wildlife resources. Many of these compounds tend to persist in sediments and may continue to circulate through aquatic systems for years to come.

Contaminants affect fish and wildlife in several ways including mortality, impaired reproductive success, birth defects, skin lesions, tumors and liver disorders. One of the most obvious effects of contaminants on fish is the development of tumors. Skin, lip, and liver tumors are most frequent, and at many locations elevated frequencies coincide with high levels of chemical contamination, particularly PAHs. However with approximately 62,000 chemicals in constant use, isolating a single causative agent may be impossible.

Reproductive success of fish may also be reduced by exposure to environmental contaminants. For example, research conducted by our Great Lakes fisheries research center found that eggs from Lake Michigan lake trout hatch at lower rates than those from the less polluted Lakes Superior and Huron. These results suggest that contaminant-induced mortality could be contributing to the failure of hatchery-planted lake trout to successfully reproduce in Lake Michigan. Likewise, population declines of striped bass on the Atlantic coast and in San Francisco Bay have been blamed, in part, on contaminant impacts on larval fish. Research by our Columbia National Fisheries Research Center on Chesapeake Bay striped bass has found PCBs, PAHs, organchlorine pesticides, and metals in eggs, larvae, and adults. Larvae were found to be particularly sensitive to the combined effects of aluminum and acidity. A study conducted on striped bass from the San Francisco Bay-Delta system found that high levels of PCBs, PAHs, DDT, and metals in adults correlated strongly with impaired reproduction. The presence of contaminants in fish can also render them undesirable for human consumption. Sixteen coastal States, including all eight Great Lakes States have consumption advisories in effect for "coastal" fishery resources. Waterfowl in certain Great Lakes and coastal States also contain contaminant levels above health advisory guidelines for poultry.

Abnormal development, including crossed bills, have been documented in Forster's terns, common terns, herring gulls, double-crested cormorants, and Virginia rails near the Great Lakes. Similar deformities have been associated with exposure to dioxins and

PCBs. Accumulation of high concentrations of PCBs, dioxins, and furans has also been linked to reproductive impairment in coastal populations of fish-eating birds and mammals. Bald eagles that nest along or near the Great Lakes shorelines have poor reproduction and high contaminant concentrations compared to inland populations. The percentage of occupied breeding areas producing fledged young and the number of fledged young per occupied breeding area are significantly lower for shoreline nesting eagles.

Similarly, Forster's terns nesting on Green Bay have significantly lower reproductive success and higher body burdens of contaminants than birds nesting in an uncontaminated inland site. Hatchability, hatching weight, incubation time, liver weight, and nest abandonment were all adversely affected at the contaminated site.

In response to the increasing threat to our trust resources, the Service has expanded its environmental contaminants program to provide a focal point for contaminant-related service activities. However, contaminant problems affect virtually every facet of the Service's programs and require close cooperation between all of our functions.

Contaminant biologists in each of our enhancement field offices work closely with other Service entities to document the presence of contaminants in the environment, assess the real or potential effects on fish and wildlife and their habitats, and take actions to prevent or remediate such problems. We currently have about 140 studies underway both on and off Service lands, including: planning and conducting preliminary natural resource surveys; collecting environmental samples for chemical analysis; site-specific contaminant investigations; remediation studies at Superfund sites; reviewing State water quality standards and certifications, and nonpoint source plans; commenting on dredge and fill permits and NPDES permits; and providing technical assistance to various Federal, State, and local agencies on pollution issues relating to fish and wildlife.

Natural resource damage assessment work related to hazardous substance releases and oil spills allows the Service an opportunity to recover money from responsible parties to restore lost or damaged natural resources. As a trustee, the Service must demonstrate contaminant effects on trust resources, establish a link between documented effects and the release or spill, and determine the extent of damages and the necessary restoration costs.

The Service, in cooperation with other trustees, has been successful in achieving substantial benefits to coastal fish and wildlife resources through recent damage assessment work. Extensive wetland restoration work in San Francisco Bay will be conducted with the nearly $12 million in damages paid as the result of an oil spill. In the northeast and middle Atlantic States, wetland restoration and American shad restoration efforts will be enhanced as the result of settlements in excess of $225,000. An oil spill in the Savannah River resulted in $1.2 million in compensation, which will be used in part to restore riparian wetlands.

The Service and the National Oceanic and Atmospheric Administration are presently investigating potential natural resource damages in the Hudson River, Puget Sound, San Francisco Bay, and Prince William Sound, where we may be able to recover damages to restore lost natural resources. We also work closely with the Environmental Protection Agency to achieve maximum benefits to fish and wildlife associated with cleanups at Superfund sites.

Pollution mitigation and habitat restoration activities are underway on many of our national wildlife refuges and are part of the Department of the Interior's Irrigation Drainwater Program. Extensive pollution-related effects, ranging from contamination of fish and wildlife and their habitat, to deformities in pelicans and waterfowl embryos, waterfowl mortality, and nesting failure have already been documented at many irrigation drainwater sites. Detailed studies are being conducted at many irrigation drainwater sites. Detailed studies are being conducted to determine the geographic extent and severity of water quality problems and to provide the scientific understanding to develop reasonable alternatives to mitigate or resolve problems.

Recent Service efforts in the Chesapeake Bay and other estuaries have enhanced our capability to protect coastal fish and wildlife resources. For example, our Chesapeake Bay Office works cooperatively with other Service offices and other Federal, State, and local entities to undertake activities to protect and restore Bay fish and wildlife. The Service effort focuses on three major areas—living resources, water quality, and public awareness.

Specific projects are directed at: Identifying the causes of declines in submerged aquatic vegetation, waterfowl, and certain anadromous fish; developing management plans for their protection and restoration; assessing and reducing the effects on point and nonpoint sources of pollution on Bay fish and wildlife; and educating the public on the value of Bay resources, environmental threats, and actions individuals can take to help protect those valuable resources.

Because of the success of this program, similar, but smaller, efforts are being undertaken by the Service to address living resource problems in southern New England estuaries, Delaware Bay, Albemarle-Pamlico Sound and Puget Sound.

Mr. Chairman, that concludes my statement. Again, I appreciate the opportunity to testify, and I will be pleased to answer any questions you may have.

Mr. NOWAK. Thank you.

We will now hear from John Carey, the Deputy Assistant Administrator of the National Ocean Service.

Mr. CAREY. Good morning. I am John Carey, the Deputy Assistant Administrator of NOAA's National Ocean Service. I am pleased to have the opportunity to appear before the subcommittee this morning to describe NOAA's activities in assessing the extent and impact of coastal pollution and our efforts to improve coastal resource management.

With me this morning are Dr. Andrew Robertson, who directs our coastal environmental quality monitoring program within the Office of Oceanography and Marine Assessment, and Kathryn Cousins, the North Atlantic Regional Manager for Coastal Management Programs in our Office of Ocean and Coastal Resource Management.

With your permission, I would like to summarize my testimony and submit the full text of the written statement for the record.

NOAA devotes considerable efforts to the issue of coastal pollution: Through our Office of Oceanic & Atmospheric Research, as part of the National Sea Grant Program, under our National Marine Fisheries habitat and related research, and through activities of the National Ocean Service in assessing the nature and extent of coastal pollution—and in assisting state and local governments in their efforts to address these problems. We even employ the National Satellite Data and Information Services' technology in assessing the nature and extent of coastal pollution.

In order to deal effectively with the coastal pollution problem we first need to understand the nature of conditions in the coastal areas. I would like this morning to touch briefly on three important trends that will directly affect our policies, management approaches, and control strategies, and NOAA's involvement in these areas: First, trends occurring in coastal population, which people have referred to; secondly, touch on trends that are occurring in the area of toxic pollution; and finally, touch on the chronic problem of nutrient discharges, which is perhaps the most insidious problem we face.

Trends in coastal population will play a significant role in how we approach the pollution problem for the foreseeable future. While direct causes of environmental quality problems are often difficult to document, evidence is mounting that many are the result of general coastal development patterns.

Many of the Nation's coastal areas are under increasing growth and development pressure. About 110 million people—almost one-half of our total population—now live in coastal areas. By the year 2010, coastal population will have grown from 80 million to more than 127 million people, an increase of almost 60 percent nationwide. Some states, including Florida, will have increased more than 200 percent.

NOAA has just issued a special Earth Week Report documenting "50 Years of Population Change Along the Nation's Coasts". I have copies of that which are available for you and members of the Subcommittee staff for use in your work and deliberations.

What that report documents is the fact that while about 10 percent of the Nation's 66,000 point source discharges are located in coastal areas, that those represent well over one-third of the total volume of waste water we are dealing with. It also indicates that 28 percent of the abandoned hazardous waste sites, including 35 percent of EPA's Superfund National Priorities List, are located in coastal areas.

Understanding these changes in demographics is important in developing the correct public policy and effective management responses to the coastal pollution problem. We have not devoted enough attention to the socioeconomic part of pollution control. That is something we have to pay more attention to.

Now let me talk a little bit about the toxic pollution trends.

Since 1984, NOAA has operated the National Status and Trends Program, to monitor the levels of toxic pollutants in shellfish, bottom-feeding fish such as flounder, and sediments at about 200 estuarine and coastal sites around the country. This is the only comprehensive national program using uniform sampling and analysis techniques to produce consistent, comparable pollution data.

Differences between sites and the trends over time can be compared and interpreted.

The pollutants which are monitored include DDT and nine other pesticides, PCBs, polycyclic aromatic hydrocarbons, and 16 trace elements such as mercury and lead.

The results of the sampling are not surprising. They reveal the national extent of the problem of toxic contamination of our coastal areas, documenting high levels of toxics in: Mussels and oysters in the Hudson Raritan Estuary, Boston, West Long Island Sound, San Francisco, San Diego, and Los Angeles; in the livers of bottom fish in South California, West Long Island Sound, San Francisco, and Elliot Bay; and in sediments in Boston, Hudson/Raritan, San Diego, Los Angeles, and Seattle.

Mr. **Nowak**. We will have those incorporated in the record so that they will serve as reference documents.

Mr. **Carey**. Very good. Thank you, Mr. Chairman.

Mr. Chairman, I would point out that there is some good news. Comparisons of our data with EPA data from the late 1970's indicates overall national decreases in lead and cadmium in bivalves, and we have found decreasing concentrations of DDT in fish and shellfish nationwide, and decreases in PCBs in selected species at some sites.

Mr. **Nowak**. DDE is also a derivative of DDT, is it not? That just came to my mind because that level has been enhancing, has it not, in some areas?

Mr. **Wayland**. I am not sure I have the information on that but DDE is a prominent degradation product of DDT. What you might be seeing is some of the DDT that is disappearing is becoming DDE.

Mr. **Nowak**. DDE could be from the use of DDT in Mexico. We don't use a lot of DDT anymore.

Mr. **Wayland**. It is a very persistent pesticide. Although it was prohibited in 1973, it has a very long half life in the environment. We are probably continuing to detect DDT that was used in the U.S. in the 1970's, although there are probably additional foreign sources contributing to its continued introduction into the environment.

Mr. **Carey**. With your permission, Dr. Robertson also has information on the question you raised.

Dr. **Robertson**. DDE and DDD are breakdown products of DDT. We are not finding that these are increasing. We are finding that the percentage of the breakdown products is increasing of the total because as time goes on DDT goes away and the breakdown products take longer to go away. So the percentage is going up. And except for the few areas, and it seems they might be related to other countries, the total amount is going down.

Mr. **Nowak**. The DDT could be air borne from Mexico after the DDT is placed on crops and year after year that could be an accumulative problem and even move across the midwestern states through the Mississippi Basin and up into the Great Lakes, correct?

Dr. **Robertson**. There is some evidence especially on Lake Superior, small increases, looking like it was fairly new. The percentage of DDT is fairly high showing it was probably fairly newly used. So there have been some increases in a few places like that.

Mr. **Nowak**. When does the break down occur, what kind of a time frame from DDT analysis so that it would turn into DDE.

Dr. **Robertson**. In the sediments we are talking about a range of a few years.

Mr. **Nowak**. Thank you, doctor.

Mr. **Moffett**. Mr. Nowak, with regard to the percentage and some of the work we have done on fish regarding DDE which is the most persistent metabolite of DDT, from 1970 until 1984 we have noticed an increase in DDE in our fish samples from roughly 48 percent in 1970 to 73 percent in 1984. So they are showing up very prominently.

Mr. **Nowak**. Thank you.

Mr. Carey, you may continue.

Mr. **Carey**. I think the important question this raises is what does all this mean in terms of the toxic pollutants and the health of the coastal ecosystems. NOAA research has been underway, conducted by the Office of Oceanic and Atmospheric Research and the fisheries labs, to try to document the relationships that are occurring here. NOAA research has documented the relationship of liver tumors in fish with high levels of polycyclic aromatic hydrocarbons. We also have identified several areas with elevated pollution levels where some fish are incapable of normal reproduction. But we are only beginning to understand the complex nature of the relationships of toxic chemicals to marine organisms and the effect that they have, for example, on the food chain. This is work that we are continuing in earnest. We are trying to understand the physical, chemical, and biological interactions of toxics with marine organisms and to try and unlock this puzzle.

With respect to the monitoring program, let me conclude that we are also working very closely with EPA in designing and building our monitoring capability so that we can in fact assess the changes that go on in the coastal environment.

We are working closely with the Status and Trends Program and the new and emerging Environmental Monitoring and Assessment Program in EPA.

Let me make a comment about nutrient discharges. Positioned at the downstream end of coastal watersheds, estuaries receive water, sediments, and other materials from large land drainage basins. These materials include the continuous addition of nutrients from both natural and human sources. Some estuaries assimilate large quantities of nutrients. However, excessive amounts of nutrients can be highly detrimental to estuaries and their uses.

Within NOAA we are developing a National Coastal Pollutant Discharge Inventory, containing information on pollutants from point sources, but also nonpoint and upstream sources that enter coastal areas. With this inventory we are developing estimates of nutrient discharges which may cause over-enrichment in downstream estuaries.

New estimates indicate that nearly 300,000 tons of phosphorus and 1.8 million tons of nitrogen are discharged annually into the 340 watersheds that drain into our estuaries.

Working with EPA's Office of Water we have begun a nationwide study to evaluate the status and susceptibility of estuaries to excessive nutrients. Forty-one of 100 estuaries are likely to retain nutrients because of their flushing and dilution characteristics, 29 of these also are expected to have medium to high nutrient concentrations, and therefore be good candidates for more study and possible management action. Two examples are Hudson/Raritan Estuary and Galveston Bay.

Clearly, nonpoint source pollution is a major coastal pollution problem, for nutrients, as well as other pollutants.

While NOAA has no direct authorities to implement pollution control programs we do work closely with the states in implementing coastal management plans. Under the Coastal Zone Management Act (CZMA), 29 states and territories, covering 94 percent of the ocean and Great Lakes coastline, have received Federal approval of their state programs.

With NOAA financial and technical assistance I believe we have made considerable progress in working with the states and through the states with local governments. In New York, for example, over 120 local waterfront revitalization plans have been developed, which address nonpoint source pollution problems; in Rhode Island and Wisconsin, setback requirements have been established for development adjacent to coastal waters; in Maryland, Washington, and North and South Carolina, stormwater management programs have been adopted; and a number of states have initiated creative efforts to protect coastal waters through special area management plans.

Mr. Chairman, if I may, as part of your record, submit one additional document recently released which deals with coastal management solutions to nonpoint source water pollution. This is a record of some of the activities that are going on through the state Coastal Zone Management Program. These are real life stories that address the kinds of activities that states have underway to deal with these problems.

Mr. NOWAK. What is the topic of that?

Mr. CAREY. It is "Coastal Management Solutions to Nonpoint Source Water Pollution."

Mr. NOWAK. Without objection, that will be included in the record.

[The publication referred to by Mr. Carey appears on p. 95.]

Mr. CAREY. I would point out that as the subcommittee may be aware the Coastal Zone Management Act is currently undergoing reauthorization. The Administration has transmitted a proposed bill, introduced by Congressman Shumway as H.R. 4438, that will focus on five national priority areas, including water quality, specifically the impacts of nonpoint source pollution. Also, wetlands protection, natural hazards, marine debris, and public access. Under this proposal, the states will be encouraged to increase their management of land uses which can impact coastal waters, through such tools as setbacks, buffer strips, and erosion and sediment controls.

We believe that the coastal zone management program provides an excellent opportunity to link the states' experience in land use management with the more scientific/technical aspects of controlling nonpoint source pollution. CZM programs have unique ties to local government land use decisions which have too often been ignored in addressing water quality issues.

We also are working closely with EPA to coordinate the activities of EPA's National Estuary Program, NEP, with the efforts of the state CZM programs. A Memorandum of Agreement was signed by the Administrator of both Agencies in 1988.

Solving coastal pollution problems will require an approach that is national in scope and scale. Solutions will require time to identify and implement, and demand significant resources from all levels of government and the private sector. There are no simple, quick, or cheap fixes to complex problems that have taken decades to create.

This year, NOAA has initiated a major new program to apply its scientific capabilities to the problems of coastal environment quality. This agency-wide effort is our Coastal Ocean Program, which will focus our diverse observation, research, assessment and monitoring programs on addressing key coastal problems, such as toxic pollution, nutrients, habitat loss, and declining fisheries. The goal is providing the scientific information needed to make sound management decisions about our coastal resources.

NOAA looks forward to working with the Congress and other federal and state agencies toward improving the quality of our coastal environments.

Mr. Chairman, this concludes my statement. I would be pleased to answer any questions you or other members of the Subcommittee may have.

[The prepared statement of John Carey appears on p. 39.]

Mr. Nowak. Thank you very much for all your testimony. You certainly have shown the progress that has been made, and it's been said many times, I guess, with the resources that we have available, we are doing the best we can.

And yet, you know, every day there is something in the paper about pollution, about water problems that, you know, shows that we are not moving nearly fast enough to, as the Office of Technology Assessment has shown, to overcome the curve, if you will.

We are still polluting at a rate it looks like that is increasing. I think all your testimony shows the volumes are increasing, and you have only had a limited area of water, forest area that you are dealing with.

So I think many of us believe that we have to do something to enhance this program if we are going to get above that curve.

Otherwise, you know, in ten years I wouldn't be here, but you will be here talking to other people about this problem of water pollution.

Let me solicit a general comment, if I can. The initiatives, either the Jones bill or the Studds bill or any mix of initiatives that you think from your perspective we could be looking at to enhance the agencies output in this area.

Let's hear from EPA, Mr. Wayland.

Mr. **Wayland**. Mr. Chairman, I think that certainly a valuable feature in some of legislative proposals is the recognition that states play a very important role with respect to water pollution control generally.

We depend upon the states to adopt water quality standards, that are based upon EPA—developed water quality criteria—these state standards serve as a basis for more stringent permit limits necessary to protect the beneficial uses of water limits whether they are upstream or coastal water bodies.

Some practical steps can and should be taken in the short run. We have given a shot in the arm to our nonpoint source program with the $40 million appropriation last year. The President's requested resources again for 1991 in the budget that is now being considered on the Hill.

We have expanded our national estuary program, as I mentioned, to create a basis for a coordinated approach to these efforts.

We have given some additional emphasis to understanding the problem of contaminated sediments and the development of criteria based upon sediment contamination, which is probably something that we are able to do under existing authority.

There clearly are constraints to how many contaminants and how many different phases we are able to address at any one time. That is why we think it's important that near-term practical measures should not be put on hold while we develop a full panoply of water quality criteria and see those adopted by states.

I think that our efforts with respect to well head protection should prove beneficial in terms of critical aquatic habitats, and will also pay dividends in terms of the ability of wetlands to contribute to reduction of toxic loadings.

I guess I can look as far as the deliberations over the Clean Air Act to see the possibility of some hopeful signs in terms of addressing the air toxics problem, which in turn should not only be beneficial in terms of the quality of the air we breathe, but also in reducing loadings to estuaries and other surface water bodies.

I think that close collaboration between the EPA programs and the Coastal Zone Management program, which is being discussed in conjunction with the Coastal Zone Management Act reauthorization, is valuable.

I am frankly not sure how much legislative impetus that needs, given the willingness of the agencies to try to combine forces to realize and enact the maximum potential of both programs.

We can benefit from additional knowledge about the stresses and health of aquatic ecosystems through improved monitoring. The agencies have some ability and certainly commitment to pursue that with or without the enactment of additional legislation.

Mr. **Nowak**. But do you have—you know, you have got to come down to resources somewhere. I mean, somebody—we talk on Page 10 of your testimony, many states, however, lack the full scientific and technical expertise, resources and institutional ability to implement and institutionalize nonpoint source controls and evaluate their effectiveness.

I mean, shouldn't that be developed on the Federal level and then turned over to the states to give them all the flexibility that they want, but give them the knowledge and the specialized kinds of treatment——

Mr. **Wayland**. I agree, Mr. Chairman. Standard setting and research and development to gain knowledge about both the ecology of these areas and the role of specific contaminants is an important federal role.

I think that there is, however, a program implementation resource shortfall at the state level. We recognize that with respect to current programs.

Many states have adopted fee systems. The President's budget incorporates a proposal for the development of a fee system for Federal permits in those relatively few states which do not have delegated NPDES permitting authority.

But resources are a major obstacle to realizing the gains we would like to see. While we have invested $58 billion in the construction of waste water treatment facilities, matched by substantial investment at the state and local level, the combined sewer overflow problem is one which will probably require tens of billions of dollars of capital.

Those demands can be addressed through the state revolving funds that have been established. However, the needs may very well outstrip the availability of resources in the foreseeable future.

Mr. **Nowak**. Just as a general question, perhaps some of the others, we talked about the nonpoint source pollution and the CSO problem, and I have received some testimony that we are talking tens of billions of dollars.

If you look at what some of the mayors, and it's bipartisan, are looking at, they are talking in terms of, you know, $78 to $80 billion, if you take anywhere near the estimate for the assumed separation of CSO, to solve it in that way.

Now, there are some less expensive things that I am sure would be implemented before, you know, that ultimate decision is made. But unless we put in the kind of research into what steps and some incentive for the states to move without the Federal Water Pollution Control Act in, at one point in time 75 percent, 25 percent grants, I don't think that program would have got started.

And I think you may have to have some quick start here, some initiative that is going to give the states a reason to participate.

And part of that will come eventually as people demand when they go to a beach, whether it's Coney Island or any other beach on the Jersey Shore and see everything from medical waste to high bacteria counts, then of course they demand, do it today.

And unless we can talk about this curve, get ahead of it, I don't know how we are ever going to proceed.

One of the initiatives in the legislation that Congressman Studds talked about is that getting some money from the offshore oil trust fund, getting a mix of dollars and also looking at fees for direct inputs into whether it's a river, an ocean or an estuary from industry, and if that brings in the kind of money that he is looking at, you would have some substantial dollars to start to put in on the other side of these problems.

Is that particular mechanism completely unadministered—cannot administrate that at all? Have you looked at that portion of the bill?

Mr. **Wayland**. Well, I would prefer not to address the issue of dedicating OCS revenues, which is not really something within EPA's ambit.

But we have undertaken a state funding study in cooperation with the states to document and try to better understand the magnitude of the shortfall in program implementation resources.

And our followup to that has been to provide technical information to states on successful fee systems, and there are a number of such systems.

A number of states are raising revenues substantially in excess of those that are made available through the Federal grant program under Section 106 of the Clean Water Act. We are also exploring the development of regulations at EPA that would give states that are not presently implementing the law an added incentive to implement the NPDES program by having EPA develop fees for federally issued NPDES permits.

Such fee programs can be practically administered. They generate substantial revenue. They become complicated, however, when one tries to develop differential fees based upon the toxicity of discharges in an effort to stimulate pollution control.

But fee systems have been successfully developed and implemented, and I think we can expect to see them proliferate among the states.

The use of revenues associated with fines and penalties is perhaps a somewhat different issue. We are concerned about the creation of perverse incentives base fee programs upon revenues related to discovering and sanctioning violations.

That is a practice we have had less of an opportunity to review. I am not sure how many instances such programs have been implemented. I think they are relatively infrequent in the water pollution area.

So of those three elements that you mention, Mr. Chairman, I think that fees are something that we are quite interested in. We have undertaken a workshop with a number of congressional staff on the potential use of fees to help offset this revenue gap we see in the water pollution area.

I think fees are a cornerstone of the Clean Water Act authorization in terms of being able to provide additional revenues for the states for the substantially expanded work load we see coming down in conjunction with the new Clean Water Act.

Mr. **Nowak**. Would anybody else like to comment on that fee?

As I stated, we don't want to create a system that allows payment for pollution, and yet we have got to have some avenue and source of revenue.

We used to talk about that trickle down was the way to go, and now, of course, in your statements we mention this program should work from the bottom up.

And I think education is a very important aspect, and all of your agencies have had programs, perhaps not as widespread as we would like.

Get a 30 second TV ad, you could really start to have an impact. But Mr. Carey, would you like to comment on that?

Mr. **Carey**. Mr. Chairman, I can not speak directly to the fee proposal, I can tell you from NOAA's perspective about the resources that we are applying to this problem. One, as I mentioned, is our Coastal Ocean Science Program, which has been supported through the appropriation process and for which we have funds to initiate that program this year. And we, in fact, are doing that.

We are also putting resources into the development of geographic information based systems to move the scientific information out into the hands of the other agencies and into the state agencies.

And the Administration's proposal on the reauthorization of the Coastal Zone Management Act does include funding, authorizing funding in that reauthorization to support continuation of state coastal zone management programs and, in fact, to create over time competitive grants that will encourage the states to focus their attention on a number of national priority areas; the water quality area being one, coastal hazards, marine debris, beach access, and habitat loss being the other areas.

So from the NOAA perspective, we are applying resources, and we are pursuing these areas within the context of our legislative mandates and statutes that we operate under.

Mr. Nowak. Let me ask one last question before we go to the other members.

I just want to ask Mr. Moffett one question. You talked about the contamination in fish. Sport fishing has been enhanced by U.S. Fish and Wildlife through stocking programs, through other initiatives that encourage state fishery departments to stock fish in the Great Lakes, all of the different types of salmon, trout that over the past 10 years really have made that sport fishing industry. They claim at this point in time, a $4.6 billion industry.

And with the turnaround in the Great Lakes after the investment of some of that $58 billion in water treatment plants and banning phosphates levels, there is no longer the algae problem that had flourished.

And, of course, that stocking program has worked, I think, probably beyond the expectation of all who initially started it.

But now we come to the problem of, can you eat the fish after you catch them. And we have got different states with different warnings. And I don't know what those warnings mean. In terms of advisories to—it's certainly not a legal notice for people eating those fish. I guess previous studies have made the IJC report for the first time come down rather heavily on some type of additional protection for not only the fishermen, but whoever is consuming those fish.

And I guess you mention Lake Michigan especially. And I am wondering what can we do in this area to try to consolidate?

Different states have different rules, and there is so much confusion out there, I am just wondering if some type of standard should not be brought forward that the states can use to develop their advisory.

Mr. Moffett. Part of the problem lies in the fact that FDA has one set of standards and EPA has another.

Mr. Nowak. That is 25 parts per million.

Mr. Moffett. Depends on the particular pollutant. But that is part of the problem.

I think most of the advisories that are out now are not advising you to not eat the fish as much as it is to watch the level of consumption of the fish and what parts of the fish you should or should not eat because of the presence of some of these contaminants, plus the fact that most of the fish that are most severely impacted are the ones near shore, because that is where most of the contaminants tend to congregate.

So if you caught a lot of fish close to shore, the advisory would certainly have more credibility than it would if you were out, say, in the middle of the lake.

So there are any number of factors there that have to go into putting out those advisories.

It's not a good, clean deal. I am not sure, without studying a little bit, whether or not we could come up with any uniform set of criteria. It might be very difficult.

Mr. Wayland. Mr. Chairman, could I just add briefly to that?

EPA has provided to states information on risk assessment methodology that they could use, together with information that EPA and others have on the inherent toxicity of various compounds, so that states can formulate their own fish advisories. Because sport fishing is not an activity in which the fish themselves are involved in interstate commerce, it is generally understood that that is and should be a state responsibility.

We haven't left the states without information, however. In addition, EPA has sponsored or participated in workshops of state officials in which they have discussed the basis for fish advisories. We have another such conference planned for this August.

But part of the reason for the variability is that the degree of contamination does vary from water body to water body based upon local conditions having to do with the degree of contamination that occurred quite some time ago, but where bottom feeding fish and other organisms continue to be recontaminated.

There is a good deal of variability, and that is one of the reasons for differences among states in terms of where advisories are placed and what those advisories contain.

Mr. Nowak. Well, I just again want to say that there are so many open-ended questions in that area, and unless we—I am reminded that in 1978, I guess EPA developed 126 priority pollutants. And it has taken an awful long time, and I guess we are looking at now you've developed 108 human health criteria and 32 aquatic life criteria; is that right

Mr. Wayland. The number I have is actually 112 human health criteria. The number was not correct in the statement that came up to you earlier, but 112 is the correct number.

Mr. Nowak. Well, we will have other questions.

Let's turn to Susan Molinari.

Ms. Molinari. Thank you, Mr. Chairman.

I suppose I want to just begin by stating that and echoing the Chairman's opening remarks after your testimony that it's a very distressing position to be put in as legislators when we look back to the last 20 years since most of this monumental legislation took place in attempting to clean up our water and, of course, our air.

And yet we find that over the last 20 years, numerous studies have been done, all they have told us is that over the last 20 years, we have yielded more pollutants, more population stress, more illegal dumping, more toxic contamination, and I am not really quite sure as to what direction we go as a Nation to not solve, as some of you have suggested, tomorrow's problems today, but yesterday's problems today

And while, of course, the bottom line is resources to all of this, we are having a difference of opinion between Mr. Studds and several other pieces of legislation and the Administration's opposition as to how we gather these resources.

In that regard, I would like you to, if you would, Mr. Wayland, expand a bit for me. I think what you were attempting to say is with regard to a fine and penalty structure as suggested in the Studds legislation, we might be tempted as a state or a regulatory agency to look the other way so that we could accrue more monies?

Am I correct in throwing that out?

Mr. **Wayland**. Well, I guess maybe my concern went in the other direction. That is, that we might prompt enforcement actions with a view specifically to generating revenue as opposed to deterring noncompliance.

I think that our efforts have to be balanced in terms of standard setting and other program implementation activities. There really is a lot of experience with enforcement-based revenue generation programs, at least EPA experience.

I am aware that there may be other governmental programs that we could look to, but the fee approach is one that we have a good deal of experience with. I would think that the considerations associated with that are fairly well understood, and that certainly provides a basis for such an approach.

Whether a fee system should be supplemented with something having to do with noncompliance penalties is a somewhat separate question.

I know that there are other countries where those approaches have been used and people are very clever at hiding their noncompliance.

I think here we have a relatively good program of self-monitoring and self-reporting of permit exceedances, and I think that if there were a revenue, important revenue aspect to some of that information, it might lead to results that we don't completely understand at this point.

Ms. **Molinari**. What then is the Federal Government's answer to industry that engages constantly in illegal discharges?

Mr. **Wayland**. We try to pursue those cases that we develop fairly vigorously.

We have frankly had greater difficulty with municipalities than we have had with industries for the most part, but we have recently taken a number of actions against local governments that had not adopted the pretreatment requirements they needed to be able to separate waste from industrial sources.

We have good compliance rates with our water quality permits, and we want to maintain that into the future as we continue to tighten down those permits and require that additional parameters be monitored and controlled.

Ms. **Molinari**. I don't mean to be difficult, and perhaps I just don't understand the situation, but it seems to me that—and I know it, and I am not going to mention states, because my colleague is here who endures as much pollution from my state as I do from his. But the point remains that it does not take an environmental expert to know that there are companies that engage in illegal discharges into the waters.

How do you then deal with that? How do you discourage that? You are not looking at me and saying everyone is in compliance right now throughout this country?

Mr. **Wayland**. No, I am not saying that. I think that there are two somewhat separate kinds of problems.

One are illegal discharges—I mean the water equivalent of midnight dumping where people hook industrial processes to storm drains or to other nonpermitted discharge points. Relatively few substantial firms are engaged because they are targets of inspection and they have little opportunity to conduct such activity.

When those are discovered, they are punished fairly severely. A knowing violation of the water pollution laws such as discharging without a permit is the basis for a criminal penalty. Those are quite serious violations. We have other instances in which permit limits are exceeded due to process upsets or poor management practices.

We like to think that for the most part those are detected in the monitoring that is required as a permit condition. And when they are, persistent and serious, that weighs in the gravity of the penalties that are sought by EPA or the delegated states that are for the most part responsible for enforcement.

We have both administrative penalty authority, and a number of states have comparable authority. We also have judicial penalty authority. We tend to use whatever is most suited to the violation.

Ms. **Molinari**. My concern comes in then with the cumulative effect, especially in an area that I represent which is counterpoint to a major industrial area, of all those companies that somehow get in that range of going over their permit into limits, but yet have not reached that which is defined by your agency or the state as incurring punitive damage or perhaps, you know, needing a permit review.

The cumulative effect of all those permit noncompliances, minimal while they may be, is still very severe on a region. And without the encouragement of a sanction, you know, most of these companies should not have those management snafus.

Mr. **Wayland**. It's also true that in all cases, the permits are not as stringent as they need to be in order to protect water quality, and we have a major effort underway this year to reopen the permit facilities that are on toxics—limited stream segments to adopt more stringent permit requirements because it was a somewhat slower process to develop all of the necessary water quality criteria as a basis for permits.

Many states have not yet adopted standards to assure that the water quality criteria are met, and in turn then have not adopted permit limits that require those standards to be attained.

So I think we need to keep continually working to assure that the right pollutants are controlled to the right degree and that there is good compliance monitoring and enforcement where that doesn't take place.

Ms. MOLINARI. And enforcement where that doesn't take place is currently very difficult; is that not true under the current staffing levels?

Mr. WAYLAND. Well, I am sure that the states as well as EPA could put additional inspectors to good use. I think that the mechanisms for enforcement provided in the Clean Water Act are by and large good and appropriate ones.

As I mentioned in the last round of amendments we had added administrative civil penalty authority to our enforcement arsenal with a view to that being a more expeditious way of addressing violations promptly.

We have made tremendous progress, and if we had not succeeded in bringing most of these sources under permit limits and having an initial round of technical based limits placed on them, we would be in much worse shape than we are today.

We obviously have a long way to go. But we also have made a lot of progress.

Ms. MOLINARI. Okay.

Now, again, if I could just get back to another point that you raised with regard to the municipalities.

How do we then as a Federal government bring these municipalities into compliance?

Mr. WAYLAND. The construction grants program provided the wherewithal for many communities to be able to construct waste water treatment and achieve secondary treatment. Many of them waited or felt that it was appropriate to wait until a grant was in hand and construction from that grant could take place before undertaking secondary treatment.

I think we succeeded several years ago in decoupling the expectation of Federal assistance with the understanding that the capital improvements needed to take place.

We have achieved secondary treatment in most of the major cities in the country, except those that looked for marine discharge waivers. We have a number of small communities which have yet to reach secondary levels.

The state revolving funds that are being capitalized by the Federal Government as a successor to the construction grants program should assist many of those communities to meet that obligation, but many of them also know they have a separate obligation to get secondary treatment in place.

We are working to try to identify and promote inexpensive technologies that can be used by smaller communities so that they don't have to in all cases employ the capital intensive practices that may be appropriate for Washington, DC or some other cities.

Ms. MOLINARI. And one last question.

With regard to the general sentiment that it should be left up to the states, we should give states and localities the flexibility to get into compliance with any of the laws that are on the books now or that we may promulgate within the near future, how do you deal with the situation, such as we are faced with constantly where the two states are looking at one another saying, I am not going to clean up my act until they clean up their act.

And there is no real—no matter what you say, area planned mechanisms for coming into how do you clean up the areas when Staten Island is polluting New Jersey, and New Jersey is polluting Staten Island, and the City of New York does not want to expend a $10 million CSO plan when floatable studies are still showing that New Jersey is bringing floatables over to our beaches, also?

How do you increase the coordination to solve that problem?

Mr. **Wayland**. Well, I guess there are two responses. One is that there are base line uniform requirements that need to be met in all states that are based upon what is reasonably available, and better available technology should provide a fairly stringent national baseline of control.

In a number of cases we are going to have water bodies, which, because of their fiscal characteristics or the population that is associated with them, are going to need to do more.

And the water quality standards based approach is what comes into play there. Where we are dealing with the nontraditional sources, the nonpoint sources, we are placing a lot of faith, frankly, in our national estuary's program in the New York/New Jersey area.

There is both the Long Island Sound program and efforts in the New York Bight where we are seeing states that share common resources, collaborate with EPA, with local governments, and with community-based organizations to identify the specific causes of the water quality problems that exist and on a concensus basis, agree upon supplemental controls that should be adopted in order to bring those sources under control.

And it requires a commitment of political will to adopt the necessary additional requirements at the state or local level, and resources for which, for the most part, we are pleased to see commitments are being made.

Because I think the advantage we have got here is that these estuaries represent a very tangible asset for those communities in terms of recreational opportunities, commercial fishing and so forth, and I think that it's a basis around which state, local and Federal organizations can rally.

Ms. **Molinari**. One last question with regard to that point then.

Getting back to your special premise that rather than fines, we should go on fees, the fees are calculated on the basis of?

Mr. **Wayland**. Well, in most instances, the fees that I am familiar with are based upon either total flows or total flows plus some factor that considers the toxicity of the discharge.

And there are a lot of variations that states have adopted. New Jersey has got one of the most sophisticated of those fee systems, raises a lot of revenue, attempts to differentiate the fee in part based upon the water quality impact of the facility and the complexity of issuing the permit.

Ms. MOLINARI. And those fees go to?

Mr. WAYLAND. The fees are going to the states.

Ms. MOLINARI. So again, there is an inherent problem there that we share the water waste, that what impacts one state impacts the other, and in most cases, as we are finding out from a lot of the oilspills impacts more greatly the other state.

And yet under what EPA is now advocating as the better way to go, the fee structure is just going to one state.

Mr. WAYLAND. Well, each state has the ability to adopt fees, and many states have to fund their own programs.

Ms. MOLINARI. But coming from Staten Island, can I go into New Jersey and impose fees on those chemical companies?

Mr. WAYLAND. Well, just to clarify, the basis of the fees that we are talking about are not inherently to discourage or eliminate pollution.

We have got very limited experience in the U.S. with those approaches which have been used abroad.

They are intended to generate the revenue to be able to implement the program of permitting, inspections and enforcement, and to supplement the state tax revenues, the Federal Government grant, and tax-based revenues that are required to run a program.

So while I am sure none of the state programs nor the Federal program is fully effective, and probably all could benefit by additional resources, the fees do provide a basis to run a more robust program and might be possible if it were only revenue based and were competing with all the other needs in a state legislature.

Ms. MOLINARI. Okay.

June one last question, then. So then from the way you answered that question, those fees are not going directly into the general revenue. They are going into a dedicated fund.

Mr. WAYLAND. Well, I think that we have examples at the state level of both, where the revenues are dedicated specifically to the program through which they are generated; other instances where they go to the state general fund, but they are considered an offset against the cost of the program. They are therefore a value to the state agency in terms of its competition in the state level budget process.

Ms. MOLINARI. I understand, and I am sympathetic to the necessary direction that EPA feels it must take at this point in time. But I think that there is still large inequities that are being suffered as long as we fail to recognize and deal with effectively, and I don't know what the answer is, that these pollutants cross borders and the structure that we have right now is not adequately compensating the victims across the board.

And in fairness to my colleague, again from New Jersey, certainly they have suffered equally from the mismanagement of New York City's combined sewer overflows and garbage dumps.

So this is not to throw blame on one or another, but to only say that I think this needs a national approach. And we are wasting our time to a very large extent and our resources by concentrating only on the state level.

Thank you.

Mr. NOWAK. Thank you very much.

We will now turn to our colleague from New Jersey.

Mr. Pallone. Thank you, Mr. Chairman.

I just wanted to start out by thanking the chairman for holding these hearings, because obviously, we continue to have a major coastal pollution problem, I think the fact that he is not focusing on any particular area but just basically asking that we look at the question as a whole is important.

Because basically, it's a unified problem, although we have different sources. We have to look at it as a whole.

One of the concerns that I have, is that in my area as a result of the events of the summer of 1988 at the Jersey shore, there was a tremendous increase in moving forward with legislation and enforcement action to try to do something about the coastal pollution problems.

And I believe that that had a major effect in creating a better summer season in 1989, which is really one of the best that we have had in a long time.

But now in turn I see a lessening of concern to some extent in the media, even perhaps with the residents and with the citizens, and that worries me because I think that we need to look at the coastal pollution problem on a long-term basis and not just react to a particular incident that occurred one summer.

So I am really pleased that we are starting these hearings. I think it's important to really focus on the overall problem. First of all I wanted to mention with regard to Congresswoman Molinari, that I actually met her for the first time at a similar type hearing dealing with coastal pollution. I know that she has been very concerned with the issue as a city councilwoman and in various capacities, and I appreciate the fact that she wants to cooperate and always has wanted to cooperate with the State of New Jersey because I think Staten Island shares the same concerns about coastal pollution that New Jersey people do.

So there is a real effort to do something on a unified basis there. I just wanted to focus on two things today. One is, this is something the chairman was kind enough to have a subcommittee hearing on in my district last year where we focused on the mud dump site, the dredge materials disposal site off the coast of the Jersey shore, off the coast of my district.

And it was a very fruitful hearing at Union Beach, and we basically came up with a number of suggestions, but were not able to resolve at that hearing exactly where to go with them legislatively.

And I have tried over on the Merchant Marine and Fisheries Committee as an amendment to the CDI bill, which I know was mentioned today, to try to focus on the dredge spoil problem, particularly as it affects New Jersey, by making some amendments that are in that CDI bill, now that it comes to this subcommittee. My amendment would basically amend the Water Resources Act of 1986 and prevent the EPA from designating a new site for dredge materials more than 20 miles offshore and also seek to create a long-term solution, first with demonstration programs and additionally with studies, so that we can phase out the mud dump site off the coast of my congressional district.

So I know that the committee is going to be focusing attention on that, but I just did want to mention it today.

The second thing I wanted to mention, a more immediate concern, and again it points out how we don't really know at any given time where the pollution problems are going to be, is that just this last week, just a few days ago, I received a number of complaints from residents in Ocean and Monmouth County, the two counties I represent, about the wood burning that is taking place now about 17 miles off the coast of the Manasquan Inlet.

This is something that I have tried to stop for a number of years. As you know, the EPA has agreed and has put in and promulgated regulations now that would end wood burning by the end of 1991. However, my constituents and myself would like to see it end immediately.

And what happened earlier this week is that a plume of smoke from the woodburning barges was visible from Monmouth and Ocean Counties, for the entire day.

I guess it was actually on Monday. And I am very concerned about it because I am told that we shouldn't be able to see the plume.

In other words, that basically if it's 17 miles offshore and given the regulations that require that the burns only take place with certain wind conditions, that we would not be able to visibly see the plume.

And so my fear is that either the barge did not go out to the 17 miles as required by law or that the prevailing winds were blowing the smoke back to shore, in which case the burn should not have taken place.

I have asked the EPA to look into that. I understand that we are going to be having a meeting on that sometime, I guess, tomorrow or the next day. I am not sure. But once again, it brings up the fear that we have at the Jersey Shore that this woodburning material is coming back to the coast.

I know that you are supposed to stop by Memorial Day, pursuant to the EPA regulations, but I would like to see it stopped even before Memorial Day, stopped immediately, because of this latest incident.

And I would like to have it fully investigated. I don't know if you are prepared to comment on that at all, but if you are not, I know that we are going to have some meeting late this week.

Mr. WAYLAND. We are looking into that, Congressman. I don't think we have information to share at this point, but we look forward to having some facts when we are able to get together with you.

Mr. PALLONE. Okay. I know, Mr. Chairman, that the agency has agreed to meet with me either tomorrow or Friday, so it's not necessary that you comment now.

But I had to bring it to your attention because once again, when we talk about coastal pollution, there are so many faucets to it. Woodburning, I think, just points out where you have not only a potential water pollution problem but also a potential air pollution problem and at the same time a navigational problem because a lot of the wood apparently goes back to the shore and has caused accidents for recreational vessels and even bathers who have been injured by some logs which purportedly came from the woodburning barge, So I just wanted to point that out to you.

Thank you, Mr. Chairman.

Mr. **Nowak**. Thank you very much, Mr. Pallone.

And on the issues of New York and New Jersey, certainly the ocean, stopping the dumping of ocean sludge and the investigations now by the operators of treatment plants on both sides is going ahead.

And I wondered if you were familiar with the progress that was made which would benefit both of the constituents I have up here?

Mr. **Wayland**. In terms of finding alternative sites to the ocean sites?

Mr. **Nowak**. Right.

Mr. **Wayland**. Well, I don't know. Tudor Davies may be able to supplement these comments. I think that we are working busily on a final regulation for sewage sludge, which we think should help—I think my understanding is that the leading option that is under consideration with respect to most of those communities is incineration of sludge.

We have got an agency policy that favors beneficial uses of sludge as a soil amendment. We are working to get our final regulation underway and to try to reassure the potential recipients of some of that sludge that it in fact can be beneficially reused in ways that are not detrimental to health and the environment and which may in fact be preferable to incineration, which is at least a near-term management mechanism but over the long term may be less desirable.

If Tudor has anything further to add, I will ask him to do so.

Mr. **Davies**. Just very simply that the enforcement agreements that we have with all the dumpers, they all are on schedule, as you know, to get out by the deadlines.

And in terms of Mr. Pallone's comments, I think EPA has been working quite closely with you on the mud dump site issue.

My staff has worked with you very closely on technical assistance on the issue of beyond 20 miles, and what we are doing with our environmental impact statement activities.

I would assure you that we are looking into the woodburning issue in terms of the plume, and we are prepared to meet with you as soon as we conclude our investigation into that.

Thank you.

Mr. **Nowak**. When we had the opportunity to visit New York City, one of the big issues, of course, was what was washing up on the New Jersey beaches coming from sewer overflows, which number 516 coming out of the New York City sewer system, into the Hudson and going down out on both shores of New York seashore and the New Jersey shore.

And the last time I was there, they had installed a floatable protective wall, a capture wall coming off of the larger combined sewer outflows.

I am wondering if you can tell us how effective those have been, if you have any idea about the benefit that has occurred since they were installed last year?

Mr. **Wayland**. Mr. Chairman, I think that the early efforts look sufficiently promising, and they were a basis for us to make a demonstration grant for the improvement and expansion of that floatable barrier.

In addition, a second of nine grants that we made recently is being used for the purchase of skimmer vessels to also try to recapture a significant amount of the floatables before they reach downstream beaches.

Mr. **Nowak**. Are they cleaned out at the source as soon as they occur? If you have a rain, substantial rain that forces a lot of the storm water out, it doesn't take long to fill a boom the size of this room very quickly with floatables, and everything from medical waste, syringes that made the New Jersey beaches so famous in 1988 could be captured if they are taken right out of there before you have other turbulence from boats and everything else that moves that material out of that boom area.

Mr. **Wayland**. I think that is the expectation in terms of how that system will operate, that the debris will be regularly removed for disposal, so that it does not end up being released.

Mr. **Nowak**. Well, let me just conclude, because we want to get to our other witness.

When we go through all your testimony, it just seems very apparent that when you talk about the number of criteria, pollutants that you can document each year to these initiatives, now looking past the secondary treatment stage and looking at the nonpoint problems, we are really just on the cutting edge of that technology.

Whether it's a simple thing like a floatable, or whether in some areas you are going to have to put a "mini-treatment plant" at some of the sewer overflows, maybe that will prove to be the cost-effective way and at least get out some level of treatment before it hits any of those waterways.

You know, we are going to be looking either at a very expensive program or making quicker progress than we are. I think everybody from the City of Richmond who has come to talk to me about the huge investment in secondary treatment, and yet now whenever they have a rain occurrence, you have a tremendous amount of higher counts of bacteria, and plus all the other things that are coming through those combined sewer overflows.

And you look at the cost, hopefully we can develop something and spend the kind of money and the research on a front end, or you are going to be ending up with a pollution program that doesn't protect that $58 billion we have already made.

I hope that you can think about that, and if you have time within the next few weeks to give us the benefit of your thoughts as to where we can go, and if more money is going to be required in certain areas, then the concentration, if you can do that administratively, that is one thing.

But I think the overall effort has to be made in bringing in the best possible scientific research that we can pull into to start to look at all of these other problems that are out there, and of the meeting of even the 1987 amendment criteria and the regulations on the storm water, the regulations on the sludge, you know, how much further behind are we going to get before we have other large problems?

The League of Cities through the Mayor of Richmond in a very bipartisan way came in and said, you know, we multiplied out some of our cities, and it looks like about a $118 billion program. I suppose it's not your position to tell us well, you can cut defense $118 billion even if you wanted to.

But, you know, somewhere we have got to make—get on the defensive track to try to bring some of these in and we would certainly appreciate your thoughts.

If we don't have them, we are going to move anyway, and we would rather have them incorporated if we could.

Thank you very much for your appearance here today; and again, we will keep the record open to fill it in as we go forward.

Thank you.

[Mr. Moffet's prepared statement appears on p. 70.]

[Mr. Wayland's prepared statement appears on p. 70.]

Mr. **Nowak**. We would now like to bring, representing the state of New York, Philip DeGaetano, from the New York State Department of Environmental Conservation. He is the director of the Bureau of Water Quality Management.

Mr. DeGaetano, welcome to the committee. Your statement, as the others, will be incorporated in its totality in the record. You may proceed as you so desire.

TESTIMONY OF PHILIP M. DeGAETANO, DIRECTOR, BUREAU OF WATER QUALITY MANAGEMENT, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Mr. **DeGaetano**. Thank you, Mr. Chairman. I appreciate the opportunity to appear on behalf of Commissioner Jorling of the New York State Department of Environmental Conservation and Secretary Gail S. Shaffer of the New York State Department of State, to discuss coastal pollution problems and the extent to which they are addressed in two very important bills now before your subcommittee: H.R. 2647, the Coastal Defense Initiative; and H.R. 4030, the Reauthorization of the Coastal Zone Management Act.

New York and its sister coastal states have worked aggressively for several decades to protect and preserve our coastal areas and to address coastal water quality degradation as provided under the Clean Water Act, CWA, and the coastal program as established by the Coastal Zone Management Act (CZMA). The Clean Water Act has been a critical element in our efforts to mitigate the degradation of coastal water quality. The CZMA has encouraged us to take a long-term view of our coastal area and its resources and has also enabled the state and its 250 coastal communities to make long-term decisions regarding the use, development and protection of our coastal resources.

Still, there are a number of water quality problems facing New York's coastal areas. In the New York-New Jersey region, floatables and pathogens have caused beach closures, and the presence of toxic chemicals has required issuance of seafood consumption advisories. In the Long Island Sound, nutrient-related algae blooms have resulted in hypoxic events leading to fish kills and fish avoidances. The presence of toxic chemicals in the Great Lakes has also required issuance of fish consumption advisories; and along the Long Island-Atlantic Coast, the presence of pathogens has led to closing of shellfish beds.

Point source discharges from municipal and industrial facilities, combined sewer overflows and stormwater runoff are the primary causes of these water quality problems. We have progressed toward alleviating and eventually eliminating these pollutant sources through independent state efforts and under the auspices of two federally-sponsored programs, the National Estuary Program and the Great Lakes Initiative. In considering Congressman Studds' coastal defense initiative and through reauthorization of the Coastal Zone Management Act, the Congress is now properly asking that other federal and state resources can be marshaled to expedite elimination of these threats to the quality of our coastal waters.

These bills differ from current federal programs in their explicit recognition that land use cannot be ignored as a contributor to existing coastal water pollution, nor can land use be ignored in the prevention of future degradation. For example, decisions allowing large-scale residential housing development can result in increased pollutant loadings into water bodies from stormwater runoff. Land use decisions should also take into account the ability of the sewage system infrastructure to transmit and treat wastewater; often times these considerations are not factored into local decision making despite their potential water quality impacts. In H.R. 2647, states are required to develop programs to meet water quality standards and must coordinate that planning with the process called for in H.R. 4030 which focuses on land use. The single, comprehensive management framework for coastal protection integrates regulatory and enforcement aspects of water quality management with sound land and resource management. As we know, Mr. Chairman, limited state and federal resources dictate that every dollar dedicated to coastal problems must be spent wisely. It is possible that the legislation under discussion today will eliminate redundancies and duplication, allowing for concentration in areas lacking necessary attention. New York has already begun comprehensive planning; and, while some adjustments may be necessary, the planning already underway is compatible with that required in both bills.

In H.R. 4030, we support the proposed national interest improvement program for coastal states to assign priorities for a variety of coastal management needs. We also support the proposed legislative clarifications, particularly those related to the federal consistency process.

Turning to H.R. 2647, I should first say that Congressman Studds and his staff have gone to great lengths to accommodate New York's suggestions for strengthening the bill. We very much appreciate his willingness to consider our concerns and we believe his bill as reported from the House Merchant Marine and Fisheries Committee represents a major accomplishment. Among its many strong provisions is an amendment by Congresswoman Lowey which extends the national estuary program and establishes an implementation phase and additional funding for that program. The creation of a Long Island Sound office within EPA will assist the management conference in the implementation of the management plan which is scheduled for completion in 1991. Some areas that deserve additional attention are as follows: One, in section 202, dealing with coastal water quality criteria and standards, we feel that EPA should be required to promulgate national standards for states which have not done so consistent with current provisions of the Clean Water Act.

Two, in section 204, concerning outstanding coastal resource waters, designations should be made using existing provisions of the Clean Water Act. Also, responsibility for the program at the state level should rest with the water quality agency.

Three, in section 205, pertaining to coastal discharge criteria, we are concerned about the impact of the changes on estuaries designated under Clean Water Act Section 320. Changing discharge criteria at this time could upset court orders which are predicated upon the current requirements.

Four, in section 206, marine sanitation devices, we request an amendment that would be consistent with most Clean Water Act programs—to allow states to adopt measures more stringent than federal dictates.

Mr. Chairman, it must also be noted that while H.R. 2647 and H.R. 4030 will be considered and are supportable, there are issues not addressed in either bill which may reduce their effectiveness in combating coastal water pollution. These issues are as follows:

Effluent standards. One of the strengths of the Clean Water Act is that it established a two-pronged approach to attaining the fishable/swimmable goals of the act. This approach relies upon establishing water quality standards and developing technology-based treatment requirements. These two important aspects of the act must be emphasized because the standards still in use by EPA have not kept pace with today's technology.

While H.R. 2647 places renewed emphasis on the development of water quality criteria and standards, we must emphasize that EPA must also move promptly to develop Best Available Technology, BAT, and categorical pre-treatment requirements for the remaining significant industrial effluent categories, as well as to update existing requirements to reflect current technology. While EPA's development of BAT and categorical pre-treatment requirements do not require legislation, the need for EPA action is imperative to attaining Clean Water Act goals.

With regards to Combined Sewer Overflows, CSOs, the contribution of CSOs to water quality problems in major New York metropolitan areas and in coastal areas is well known. New York has been addressing CSO pollution since the 1960s by concentrating on elimination of dry weather overflows and the control of solid and floatable materials in CSO discharges. The EPA has recently released a CSO control strategy which we believe has merit and is worthy of congressional attention, particularly in the context of coastal water quality programming. A congressional dictate along the lines of the EPA proposal, that is, to require elimination of dry weather overflows and to minimize CSO discharges, would greatly assist in remediating the coastal waters where CSOs are occurring now and where they will continue absent government intervention. However, limited public resources require government to recognize that CSO-caused use impairments vary in severity and that some sort of priority ranking system must be developed for use in setting permit and expenditure requirements.

With regards to program funding, Mr. Chairman, I acknowledge that the subcommittee's jurisdiction is in setting authorized levels of funding rather than in making actual appropriations for carrying out the purposes of the Clean Water Act. However, please bear in mind the history of congressionally-mandated programs which are well-intentioned but often carry much fewer dollars for state implementation than was anticipated at the time of their conception. Both the bills under consideration here today propose what appears to be funding sufficient to realize their stated objectives. However, both bills impose new responsibilities on state governments which cannot be met if federal appropriations do not match authorized levels. We ask that if these bills are enacted in their current form, this subcommittee do all it can to ensure that new programs are properly funded.

In conclusion, let me once again thank you for this opportunity to address coastal water quality issues and the proposed legislation. Both bills are important; in particular, reauthorization of the Coastal Zone Management Act this year is critical to allowing continuation of these important services. We appreciate your efforts to expedite consideration of this measure.

This concludes my testimony. I would be happy to respond to any questions you have regarding my testimony or to provide any additional information you or your staff may need.

Mr. NOWAK. Thank you, very much. I just had a couple of questions. One of the comments EPA made was that they published the so-called saltwater human health criteria for 62 pollutants and the saltwater aquatic life criteria for 25 pollutants.

They mentioned that states are making progress in meeting the mandate to adopt those criteria but they also say that few states have so far adopted the saltwater human health standards; 21 of the 28 marine coastal states have now saltwater standards protecting aquatic life. Is that correct? Has New York adopted that saltwater standard?

Mr. DEGAETANO. New York has adopted water quality standards for a limited number of toxic substances in the marine water, basically those we have found are currently being discharged. We are in the process of adding to those regulations this year by adding some new substances for the marine waters to address a criteria that have been recently developed by EPA.

Originally our standards were adopted in 1985. So some additional criteria documents have been published since then. We are going to be addressing some of those in a current rule making in 1990. We hope to address remaining substances in future rule makings.

Mr. NOWAK. From the comments you made I take it you generally support those initiatives, at least to accomplish the general goals of getting more dollars to the states and getting more research on the federal level and developing that technology base that we need.

The fee proposal that was made, does that have your endorsement or Commissioner Jorling's endorsement? Do you collect a fee as New Jersey does?

Mr. DEGAETANO. In New York we currently collect the fee. Our understanding of the provisions of the coastal management initiative is that the fee provisions would hold harmless, that is our state would be guaranteed at least as much as we are currently getting through our fee structure. If there was a fee differential in terms of the fee established by CDI, the state would have an opportunity to share in the grant program to the extent that we could receive additional funds out of the coastal defense funds to assist us.

Mr. **Nowak**. Do you have that figure? Do you know what the fee structure produced last year in New York was?

Mr. **DeGaetano**. No, I don't but I can get that information.

Mr. **Nowak**. It would be interesting to see what it did produce and how it is based, upon what, you know, there is a volume of water plus toxicity.

Mr. **DeGaetano**. It is generally based on a design and actual flow characteristics. We have not——

Mr. **Nowak**. Then the design and flow is tested and then assessment made by the DEC?

Mr. **DeGaetano**. That is correct.

Mr. **Nowak**. Is that all over the coastal areas or is it a general fee on any body of water within or without the coast line?

Mr. **DeGaetano**. It is a state-wide fee that is made on all discharges. It is more extensive than would be in this legislation because it covers both ground and surface water discharges.

Mr. **Nowak**. It therefore covers the whole state?

Mr. **DeGaetano**. That is correct.

Mr. **Nowak**. Lake Onondaga included?

Mr. **DeGaetano**. Correct.

Mr. **Nowak**. We talked about the overflow problem. I cannot help but visually see the overflow out of that New York system coming into the Hudson River on a rainy day last summer. I am wondering if—is that covering all the overflows now, that kind of a system?

Mr. **DeGaetano**. The terms of the collection mechanism that was installed?

Mr. **Nowak**. Yes.

Mr. **DeGaetano**. No. That is a demonstration project that the city of New York instituted to determine whether that type of technology, under what sets of circumstances could it be used to help reduce floatable discharges to the harbor.

That is something that is going to be actively considered by New York City as it develops the final combined sewer overflow management program they are currently working on which they estimate is going to cost at least $1.5 billion to implement.

Mr. **Nowak**. I think you make a good point when you talk about the upgrading, perhaps, of the best available technology that was put into place. Perhaps if this is done industry wide and we first bring in all the industries that are supposed to be covered, the pretreatment technology that is, I understand, in some industries being developed is much improved.

I hope we can encourage that all over. I guess one of the real questions we will have to answer is how to best encourage that additional investment by looking at perhaps what the other cost benefit is if we don't invest in that new technology or encourage those who are using our water waste for discharge to do so.

We appreciate your testimony.

Let me turn to Susan Molinari from New York.

Ms. **Molinari**. Thank you, Mr. Chairman.

I would like to concur with your remarks. Please allow me the opportunity to take advantage of our witness, not to ask a question, but to ask that the points that you raised in terms of prevention for coastal areas be extrapolated and put forth with regard to DEC regulation of the Croton.

New York City discovered in a series of hearing in the Environmental Protection Committee is that the lack of land-based management along New York's waterways providing our drinking water is more dangerous than our coastal waters.

We may be at the point of no return also from a state-wide basis in terms of the purity and integrity of our drinking water.

Let me ask the witness to take my very serious concerns with regard to DEC management with regard to the drinking water back to his Commissioner Jorling with regard to a future congressional hearing.

Mr. **DeGaetano**. I will do that. It is a very serious concern. One of the things that my department is hoping is that when the EPA promulgates its stormwater regulations that that tool will be a very valuable tool to state agencies to address some of the concerns that exist in watersheds such as the Croton and Catskill system where development pressures are causing degradation of quality and we don't have existing regulatory tools especially in the area of stormwater management to address some of those concerns.

Mr. **Nowak**. Thank you, very much. We appreciate your taking the time and preparing your testimony as you did.

It broadens out what we will have to consider and gives us an idea that we will be back in touch with you for some more specifics, I am sure, as to the best way to move forward.

Thank you and Commissioner Jorling for sending you down here to give us the benefit of your experience.

Mr. **DeGaetano**. Thank you.

Mr. **Nowak**. The subcommittee will now recess until 10:00 o'clock tomorrow morning.

[The prepared statement of Mr. DeGaetano appears on p. 62.]

[Whereupon, at 12:15 p.m., the subcommittee was adjourned.]

PREPARED STATEMENTS OF WITNESSES

Mr. Chairman and Members of the Subcommittee:

I am John Carey, Deputy Assistant Administrator for Ocean Services and Coastal Zone Management of the National Oceanic and Atmospheric Administration (NOAA), within the U.S. Department of Commerce. I'm pleased to be here today to summarize results of activities of the National Oceanic and Atmospheric Administration to assess long-term trends in coastal pollution and to discuss ways in which government at all levels can be strengthened to meet the challenge of improving the environmental quality of coastal areas throughout the United States.

The coastal pollution problem is truly national and not limited to only a few specific coastal or estuarine areas. Solutions to the problem will require an approach that is national in scope and scale. They will require a long time to identify and implement. They will require significant resource investments at all levels of government and the private sector. There are no simple, quick, or cheap fixes to complex problems that have taken decades to create. The problems are formidable, but they are not insurmountable.

This year, NOAA has initiated a major new program to apply its scientific capabilities to the problems of coastal pollution and coastal resource losses. This agency-wide effort known as the Coastal Ocean Program, is designed to focus NOAA's diverse observational, research, assessment and modeling capabilities on key problems in the Nation's coastal areas, specifically nutrients, toxicants, habitat loss, declining fisheries productivity, and coastal storm damage. The goal of the Coastal Ocean Program is to develop scientific information to support decisionmakers at all levels so that they can make informed choices in managing the Nation's ocean and coastal resources.

Trends in Coastal Population

Coastal areas of the contiguous United States, including the Great Lakes, are now the home of about half of our population. This is significant because these coastal areas account for only about 10 percent of the total land area. The population density of coastal counties is five times greater than non-coastal counties across the Nation. Population densities in the coastal counties of the Atlantic coast are 10 times those in non-coastal counties of the rest of the United States.

By the year 2000, population growth and associated coastal development will stress these coastal areas even further. According to projections of the National Planning Association, population in northeastern coastal areas will grow about 10 percent by the turn of the century. However, the population of other coastal regions will grow even faster--at rates ranging from 31-46 percent, the latter in the southeastern United States. Only the coastal population of the Great Lakes is expected to decrease, in this case, by about four percent. These projections are summarized in a new NOAA report on coastal population trends, released last month during Earth Week, and I can make copies available for the Subcommittee.

Today our major population and industrial centers are centered in coastal areas. Hundreds of thousands of people directly derive their incomes from working on or near the coastal ocean. It touches the lives of millions who buy goods transported by sea, who visit coastal areas for recreation, and who consume products developed from its resources. About 40% of American industry and almost half of Canadian industry are located in the drainage basin of the Great Lakes alone.

Coastal populations are large consumers of housing, including seasonal housing, water, and energy. As a consequence, they are also major modifiers of coastal habitats and major producers of solid waste and wastewater.

Since coastal areas are centers of industry and commerce, they often become the final resting place for the wastes generated in industrial production processes. In 1989, for example, coastal areas accounted for 28 percent of abandoned hazardous waste sites, including 35 percent of those on the U.S. Environmental Protection Agency's (EPA) National Priorities List--those having the highest priority for cleanup.

For the foreseeable future, coastal areas will continue to be major population and economic centers. Effective management is required to ensure that environmental quality is not stressed further.

Trends in Pollutant Discharges

Pollutant discharges to coastal areas are significant and will increase as population and industry continue to concentrate along the coast. Although extensive pollution control investments are already in place and many coastal facilities now discharge fewer "conventional pollutants" by volume, the shear number of new facilities and the increases in the overall volume of discharges will offset to some degree these reductions. For example, while only about ten percent of the Nation's 66,000 point sources are located in coastal areas, they account for over one-third of the total volume of wastewater discharged throughout the country.

Over one-fourth of the 2,900 major wastewater treatment plants discharging more than one million gallons per day in the United States are located in coastal counties, reflecting the concentration of population in these areas. Sludge production associated with these plants, currently estimated at 3.4 million dry tons per year, is projected to increase 80 percent by the year 2000. As space for landfills in coastal areas becomes more scarce and environmental regulations more stringent, finding acceptable sites and methods for sludge disposal in the Nation's coastal areas will become increasingly difficult.

Trends in Toxic Pollution in Coastal Areas

For each of the past six years NOAA's National Status and Trends Program has systematically monitored estuarine and coastal sites throughout the Nation to determine the concentrations of toxic pollutants in mussels and oysters, bottom-feeding fish (such as flounders), and sediments. The program is comprised of two major field sampling projects: the NOAA Benthic Surveillance Project and the NOAA Mussel Watch Project. Through the former, we have measured the concentrations of synthetic organic compounds and heavy metals in fish and sediments at about 50 sites each year since 1984. We have added a few new sampling locations and skipped others in some years to increase the total spatial coverage over the long term. Since 1986, through the NOAA Mussel Watch Project, we have measured the concentration of these same pollutants in mussels, oysters, and associated sediments at an additional 150 sites.

During 1989, a joint EPA-NOAA committee was established to provide coordination of the coastal and estuarine environmental monitoring programs of the two agencies. The committee's goal is to develop the foundation for a unified, national program for monitoring the status and trends in the environmental quality of the waters around the coasts of the United States. One objective is to merge NOAA's existing National Status and Trends Program for Marine Environmental Quality with the Near Coastal Ecosystems component of EPA's developing Environmental Monitoring and Assessment Program (EMAP) to produce a single, well-coordinated coastal and estuarine monitoring program with support from both agencies. So far, a common suite of chemicals to be monitored has been established, and quality control and assurance procedures have been merged. Agreement has also been reached to carry out joint measurements and assessments in the EMAP pilot project that will be conducted this summer in the mid-Atlantic region between Cape Cod and the mouth of the Chesapeake Bay.

EMAP development notwithstanding, NOAA's National Status and Trends (NS&T) Program has been the only national program that is using uniform methods to collect and analyze toxic pollutant concentrations in selected coastal fish, shellfish, and sediments to produce a consistent, high quality data base with which to compare these concentrations across sites and to analyze trends over time. We have placed special emphasis on quality assurance and quality control so that the scientific validity of these comparisons can be objectively judged. We are working with both the National Institute of Standards and Technology and the National Research Council of Canada on continuing performance evaluations to ensure consistency within our participating laboratories and comparability among laboratories. The pollutants that are monitored include: DDT and its metabolites; nine other chlorinated pesticides, including aldrin, dieldrin, and mirex; polychlorinated biphenyls (PCBs); 18 polycyclic aromatic hydrocarbons (PAHs); and 16 elements.

Sampling sites have been selected to be "representative" of general conditions of the areas in which they are located.

From a national perspective, the highest concentrations in bivalves (mussels and oysters) for most pollutants were found in the Hudson/Raritan Estuary, Boston Harbor, Western Long Island Sound, Baltimore Harbor, San Francisco Bay, San Diego Bay, and near Los Angeles. The highest concentration of total PCBs in bivalves was found in Buzzards Bay; for total pesticides, both DDT and non-DDT, the Hudson/Raritan Estuary; for total PAHs, Elliot Bay (near Seattle); for lead, Marina Del Rey; and for mercury, Tampa Bay.

The highest concentrations in the livers of bottom-feeding fish (primarily flounders, spot, and croakers) for most pollutants were found at Southern California sites (e.g., Dana Point, San Diego Harbor, Seal Beach, and Santa Monica Bay), Western Long Island Sound, San Francisco Bay, and Elliot Bay. The highest concentration of total PCBs in fish livers was found in San Diego Bay; for total pesticides, Boston Harbor; for DDTs, San Pedro Canyon; and for mercury, San Francisco Bay.

Samples from the upper few centimeters of sediments at NS&T sites have also been measured to determine the concentration of the same toxic materials. Among the most contaminated sediments were those at sites in Boston Harbor, the Hudson/Raritan estuary, and around San Diego, Los Angeles, and Seattle. For the most part, sites in the Gulf of Mexico and the southeastern United States show lower levels of contamination. However, for some pollutants, higher levels were found at sites near the Florida cities of Jacksonville, Tampa, Panama City, and Fort Walton Beach.

With only a few exceptions these results are not surprising, but they do reveal the truly national extent of the problem of toxic contamination of bottom-feeding fish, bivalves, and sediments throughout the coastal waters of the United States. There is some good news, however. A comparison of our Mussel Watch results with those from an EPA survey in the late 1970's indicates overall national decreases in lead and cadmium concentrations in bivalves, but an increase in copper. Further, based on NOAA analyses of historical monitoring data from 13 other national programs, decreasing concentrations of DDT contamination of fish and shellfish are evident nationwide. Decreasing concentrations of PCBs, dieldrin, and toxaphene in selected species at specific sites are also evident.

We have also analyzed the latest three years of the NOAA Mussel Watch data to look for hints of possible trends in concentrations of pollutants in mussels and oysters at about 150 sites throughout the United States. Our objective is to find those sites where pollutant levels are decreasing or increasing significantly due to human activities and to indicate places where control strategies are effective or not. Since the data are for only three years, however, and are spatially limited to only 150 sites, our analyses must be viewed as very preliminary and must be interpreted with caution. They are nonetheless among the first systematic signals of trends in national coastal environmental quality and will be more reliable as indicators as additional years of data are added.

Our preliminary results present a mixed picture of trends in coastal environmental quality. In general, all classes of chlorinated organic compounds show a stronger tendency to decrease rather than increase. This finding is consistent with the fact that uses of all of these compounds have been banned or severely restricted. Specifically, levels of polychlorinated biphenyls, DDT, chlordane, and dieldrin tend to be decreasing. Changes in high and low molecular weight PAHs were about evenly split between increases and decreases. Cadmium levels also appear to be decreasing, but levels of mercury and selenium appear to be increasing.

Within individual coastal systems the picture is even more complex. For example, in the Hudson-Raritan estuary and other New York Bight sites, levels of chlordane, dieldrin, and cadmium are decreasing, but levels of chromium, copper, mercury, and nickel appear to be increasing. Levels of DDT in mussels, despite a ban on its use since 1973, appear to be increasing in Mississippi Sound and in Marina Del Rey near Los Angeles. The full report documenting these results was recently printed by NOAA, and I will be happy to provide a copy to the Subcommittee.

What do these elevated levels of toxic pollutants mean in terms of the "health" of coastal ecosystems? NOAA research has already documented relationships between liver tumors in fish and the presence of elevated levels of aromatic hydrocarbons. We have identified areas of Puget Sound, San Francisco Bay, and the Southern California Bight where some fish are incapable of normal reproduction. Because of the complexity of the coastal ocean and the multitude of toxic chemicals in it, 100 percent certainty of causal relationships between toxic chemicals and the diminished reproductive capabilities in fish and shellfish may never be possible. However, our studies are adding to the base of circumstantial evidence.

Under the Coastal Ocean Program, NOAA has begun to focus research on these questions. The focus of this year's toxicant research includes intensive bioeffects surveys to determine the magnitude and extent of ecological degradation related to contamination in two areas -- Tampa Bay and the estuarine portions of the Hudson and Raritan Rivers. A second area of research is designed to improve the methods we rely on to measure levels of exposure or response of organisms to toxic contaminants. In the next few years, this program will continue these two areas of research, along with a third area to study how contaminants are transported into coastal waters and what happens to them once they are there. This information will help us understand the immediate and long-term effects these chemicals have on living resources.

In addition, NOAA is working cooperatively with the EPA Chesapeake Bay Program (CBP) to study toxic contaminants in response to the 1989 Toxic Control Strategy adopted for the Bay area.

Not only do we need to know much more about the effects of toxic pollutants, we need to know more about their sources in order to know what to do about them. For example, how much of what pollutants are generated and discharged by what sources when, where, and over what time periods? This is an extraordinarily complex problem even for a single estuary, let alone the entire United States. Within NOAA we are working to improve knowledge through development of our National Coastal Pollutant Discharge Inventory, containing information on pollutants from point, non-point, and upstream sources that enter coastal areas.

For example, we know that there are over 8,500 direct-discharging point sources (industrial facilities and wastewater treatment plants) in the Nation's coastal areas. About 1,000 of these have some connection to the chemical industry. However, overall, we have very little comprehensive monitoring information on the toxic pollutants that many of these facilities might be discharging to coastal environments.

We also have a very incomplete understanding of the quantity of toxic pollutants that are generated "upstream" and transported into the Nation's estuaries through rivers and streams. To improve our understanding of this aspect of the problem, NOAA, working closely with the U.S. Geological Survey, is now attempting to estimate these "upstream loads" for 119 rivers and streams entering coastal areas in the contiguous United States.

I want to emphasize that it is important to understand better the characteristics of the sources that contribute to the levels of toxic pollutants we observe in our monitoring programs. Without a comprehensive understanding of these sources it is difficult, if not impossible, to arrive at meaningful interpretations of monitoring data and to identify and implement effective management strategies.

Nutrient Discharges to Coastal Areas

Positioned at the downstream end of coastal watersheds, estuaries receive water, sediments, and other materials from large land drainage basins. These materials include the continuous addition of nutrients from both natural and human sources. Some estuaries can assimilate large quantities of nutrients. However, excessive amounts of nutrients can be highly detrimental to estuaries and their uses. Nutrient over-enrichment results from the accumulation of algae-producing materials such as nitrogen and phosphorus in our Nation's water bodies. This can result from natural processes or be induced by human activities such as agriculture and sewage treatment. Increasing evidence of reduced fish catches, loss of habitats, and degradation in water and sediment quality caused by nutrient over-enrichment indicates that difficult choices must be made to limit nutrient discharges. New estimates developed by NOAA's National Coastal Pollutant Discharge Inventory Program indicate that nearly 300 thousand tons of phosphorus and 1.8 million tons nitrogen are discharged annually into the approximately 340 catchment areas that drain into the Nation's estuaries. In almost half of these catchment areas, agriculture accounts for 20% or more of the land use; and in about one-sixth of the areas agriculture accounts for 40 percent or more of the land use. Non-point sources are clearly a significant source of nutrient discharges into many estuaries and coastal areas.

Based on the assessment of nutrient over-enrichment in U.S. coastal waters, NOAA, through its Coastal Ocean Program, plans in the coming year to expand its National Status and Trends Program to monitor conditions associated with nutrient over-enrichment in areas with substantial problems.

Working closely with the Environmental Protection Agency's Office of Water, NOAA has begun a nation-wide study to evaluate the status and susceptibility of the Nation's estuaries to excessive discharges of nutrients. From a preliminary assessment of almost 100 estuaries in NOAA's National Estuarine Inventory, we concluded that 41 are likely to retain nutrients for extended periods based on their flushing and diluting characteristics. Based on NOAA nutrient loading estimates, 29 are expected to exhibit medium to high concentrations of nutrients. Their ability to retain nutrients, coupled with high pollutant loads, make them good candidates for more detailed analyses and possible additional management actions to reduce levels of nutrient discharges.

As a part of the Coastal Ocean Program, NOAA initiated a study in FY 90 to examine the effects human-induced nutrient enrichment has on the water quality and productivity of the Mississippi River Plume. These efforts will be extended next year to the Southeast Atlantic Bight, and later will be expanded to the Yukon River plume as a control area.

Trends in Shellfish-Growing Waters

Based upon an examination of the quality of shellfish growing waters in over 100 estuaries, NOAA has determined that in 1985 over nine million acres, almost two-thirds of the total waters suitable for shellfish growing, were approved for harvest. Twenty-one percent of waters not meeting approved standards were prohibited from use, 13 percent were conditionally approved, and fewer than one percent were restricted.

Most changes in classification between 1971 and 1985 were attributable to changes in administration of state shellfish programs. Northeast waters that do not meet approval requirements of the National Shellfish Sanitation Program (NSSP) are affected mainly by sewage treatment plants, combined sewer outfalls, and urban runoff. In the

Mid-Atlantic, boating activities have major impacts; in the Southeast, runoff of animal wastes is a major factor. Upstream sources affect over half of the harvest-limited and most productive waters in the Gulf. West coast waters are affected by non-point runoff, particularly from animal sources.

A recent series of NOAA reports detail the status of shellfishing waters of the United States. Since shellfishing waters are classified for the commercial harvest of oysters, clams, and mussels based on public health concerns, we are assessing the effectiveness of this system and questions that have arisen about the use of fecal coliform as the indicator of choice in the NSSP. Efforts are now underway by Federal scientists, the private sector, and regulators to establish the relationships between pollution sources, indicators, and shellfish-borne disease.

Primary shellfish-harvesting centers are changing. For example, over the past 15 years, the east coast industry has experienced a severe decline in shellfish available for harvest. This decline is a result of past over-harvesting, shellfish mortality from shellfish disease and predation, and increased closures due to pollution.

In the oyster grounds of the Mid-Atlantic, the diseases, MSX and dermo, have devastated the resource. The Gulf Coast has become more important as a source of oysters. A decline in freshwater inflow is affecting the Gulf production, however, forcing the industry to increase culture and relay activities. In Maine, North Carolina and South Carolina, closures due to paralytic or neurotoxic shellfish poisoning are added to those due to pollution. Clam harvests have shifted from coastal New York to the Indian River of Florida due partially to Florida programs that allow for relay and depuration.

Trends in Coastal Wetlands

Coastal wetlands are one of our Nation's most valuable natural resources. They provide critical habitat for fish, shellfish and wildlife, buffer coastal areas against storm and wave damage, and filter and process agricultural and industrial wastes. They also generate large revenues from a wide variety of recreational activities such as fishing and hunting. Unfortunately, coastal wetlands continue to disappear in certain areas at an alarming rate.

For example, in coastal Louisiana, the rate of loss of coastal wetlands has accelerated from about 5 square miles per year early in the century to approximately 50 square miles per year between 1956 and 1978. Recent studies suggest the rate of loss has slowed down somewhat during the 1980s, but the rate still is approximately 40 square miles per year, or about one percent of remaining coastal wetlands in

Louisiana per year. Losses such as these can have far-reaching effects.

Based on long established relationships and studies demonstrating the dependency of coastal fish and shellfish on estuarine wetlands, NOAA has estimated that the loss of wetlands in the United States has resulted in losses of millions of dollars in fisheries products. Natural coastal and deltaic processes coupled with human activities have accounted for the rapid loss of Louisiana's coastal wetlands. The long-term forces of subsidence, sea-level rise, saltwater intrusion, and erosion have been responsible for the natural loss of wetlands. Flood protection in the flood-prone lower Mississippi Valley and development have also caused wetland loss. Furthermore, rising costs of and demand for waterfront property will cause increased competition in coastal areas for limited space.

NOAA CoastWatch, an element of the Coastal Ocean Program, provides up-to-date mapping information on the status and rate of change of the Nation's coastal wetlands and seagrasses. This effort builds on several Coastal Zone Management-funded state efforts to use satellite imagery and other data sources to develop coastal wetland databases and trend analyses. NOAA's ongoing mapping effort in the Chesapeake Bay will be broadened to cover other areas along the east coast, Gulf of Mexico, and west coast. State resource managers will be able to easily access this information and use it in their efforts to protect and restore wetlands.

The Estuarine Habitat Research Program is another Coastal Ocean Program effort focusing on coastal wetlands and seagrass research. Its three objectives this year include: (1) What are the effects of freshwater inflow changes on salt marsh viability, (2) How can seagrass and salt marsh habitats be restored; and (3) How do environmental stresses affect seagrass habitats and what are the consequences of losses of seagrass habitat.

Predicting Coastal Pollution Problems

Over the next 10 years, Federal, State and local governments will make decisions about the use of coastal resources that will determine whether these economically and environmentally important areas will continue to be a valuable national resource. NOAA plays a vital Federal role in developing and implementing solutions to many of the problems confronting the Nation's coastal areas. That role includes legislatively mandated responsibilities for the management of living marine resources, providing leadership and technical assistance to states participating in the Coastal Zone Management Program, as well as providing predictions, advice, and the sound scientific basis for environmental decisions made by public agencies at all levels of government. Simply stated, one of our principal roles is to provide the best information we have to improve coastal environmental quality decisions and decisionmaking. Increasing the capabilities of public decisionmakers to assess and predict emerging problems, that is, to address tomorrow's problems today, is also a goal of NOAA's Coastal Ocean Program.

This focus on developing information for the Nation's coastal ocean decisionmaking is changing the fundamental role of NOAA. It requires basic changes in the types of products developed, services provided, data collection, research, and assessment activities undertaken, and the timing and manner in which these products, information, and services are developed and delivered. It will also require that NOAA work closely with state and local decisionmakers to understand their needs and what information can be of greatest use to them.

Strengthening Coastal Management

Clearly the Nation needs effective programs at all levels of government to manage the quality of its coastal resources. We believe that a long-term, coordinated Federal-state-local approach is needed to tackle the problems of coastal pollution.

In 1972, the Coastal Zone Management Act (CZMA) was enacted to plan comprehensively for, and manage development of, the Nation's coastal land and water resources. This national program promotes the wise use and protection of sensitive coastal areas by establishing a partnership of Federal and state government that seeks to balance the protection and development of resources in the U.S. coastal zone. To date, 29 states and territories, covering 94 percent of the U.S. coastline, have received Federal approval of their coastal zone management programs. Wetlands protection and water quality management in estuaries and other coastal waters are important elements in the coastal management programs of many states.

With the financial and technical assistance provided by NOAA under the CZMA, these states and territories have made great progress in addressing coastal problems. Significant benefits have included the protection of wildlife and fisheries habitats, and the reduction of land use impacts on water quality. In Rhode Island and Wisconsin, for example, setback requirements have been established for development adjacent to coastal waters. Stormwater management programs have been adopted in Maryland, Washington, North Carolina, and South Carolina. Several states also have initiated creative efforts to protect coastal waters through special area management programs or land management requirements for adjacent lands and are dealing with pollution stemming from specific water uses, such as marinas.

The CZMA is currently undergoing reauthorization. The Administration has transmitted a proposed bill that will focus on five national priority areas, including water quality. Under the Administration's proposal, the states will be encouraged to increase their management of land uses which can have a significant impact on coastal waters. These efforts will include increased use of such management techniques as setbacks, buffer strips, and erosion, and sediment control procedures, and will be coordinated with the EPA's non-point source program at both the Federal and state levels.

Over the past year, NOAA's Office of Ocean and Coastal Resource Management has worked closely with EPA's Office of Water to coordinate the efforts of state CZM programs with EPA's National Estuary Program (NEP). The strategy has involved coordination of statewide efforts to improve water quality under the CZMA with efforts to combat pollutants within individual estuaries under the NEP. Under a Memorandum of Agreement signed by the Administrators of both agencies in 1988, EPA agreed to submit Comprehensive Conservation and Management Plans developed for the NEP for incorporation into the state CZM programs. NOAA and the U.S. Geological Survey are to provide scientific support and technical assistance to EPA for the development of national guidance on the management of water quality programs to address more effectively the health of living and marine estuarine resources. In addition, NOAA is directly involved in all NEP's, represented by a network of regional NOAA experts. We have onsite coordinators in Annapolis, MD, at the Chesapeake Bay Program and in the Stennis Space Center, MS, at the Gulf of Mexico Program.

NOAA looks forward to continuing to work closely with the Congress, as well as other Federal and state agencies, to strengthen our collective efforts to improve the quality of our coastal environments.

Mr. Chairman, this concludes my statement. I would be happy to answer any questions you might have.

TESTIMONY OF

PHILIP M. DEGAETANO

DIRECTOR, BUREAU OF WATER QUALITY MANAGEMENT
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES

HOUSE PUBLIC WORKS AND TRANSPORTATION COMMITTEE

MAY 9, 1990

MR. CHAIRMAN, I APPRECIATE THIS OPPORTUNITY TO APPEAR ON BEHALF OF COMMISSIONER THOMAS C. JORLING OF THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, AND SECRETARY GAIL S. SHAFFER OF THE NEW YORK STATE DEPARTMENT OF STATE, TO DISCUSS COASTAL POLLUTION PROBLEMS AND THE EXTENT TO WHICH THEY ARE ADDRESSED IN TWO VERY IMPORTANT BILLS NOW BEFORE YOUR SUBCOMMITTEE: HR 2647, THE COASTAL DEFENSE INITIATIVE; AND HR 4030, THE REAUTHORIZATION OF THE COASTAL ZONE MANAGEMENT ACT.

NEW YORK AND ITS SISTER COASTAL STATES HAVE WORKED AGGRESSIVELY FOR SEVERAL DECADES TO PROTECT AND PRESERVE OUR COASTAL AREAS AND TO ADDRESS COASTAL WATER QUALITY DEGRADATION AS PROVIDED UNDER THE CLEAN WATER ACT (CWA), AND THE COASTAL PROGRAM AS ESTABLISHED BY THE COASTAL ZONE MANAGEMENT ACT (CZMA). THE CLEAN WATER ACT HAS BEEN A CRITICAL ELEMENT IN OUR EFFORTS TO MITIGATE THE DEGRADATION OF COASTAL WATER QUALITY. THE CZMA HAS ENCOURAGED US TO TAKE A LONG-TERM VIEW OF OUR COASTAL AREA AND ITS RESOURCES AND HAS ALSO ENABLED THE STATE AND ITS 250 COASTAL COMMUNITIES TO MAKE LONG-TERM DECISIONS REGARDING THE USE, DEVELOPMENT AND PROTECTION OF OUR COASTAL RESOURCES.

STILL, THERE ARE A NUMBER OF WATER QUALITY PROBLEMS FACING NEW YORK'S COASTAL AREAS. IN THE NEW YORK-NEW JERSEY REGION, FLOATABLES AND PATHOGENS HAVE CAUSED BEACH CLOSURES, AND THE PRESENCE OF TOXIC CHEMICALS HAS REQUIRED ISSUANCE OF SEAFOOD CONSUMPTION ADVISORIES. IN THE LONG ISLAND SOUND, NUTRIENT-RELATED ALGAE BLOOMS HAVE RESULTED IN HYPOXIC EVENTS

LEADING TO FISH KILLS AND FISH AVOIDANCES. THE PRESENCE OF TOXIC CHEMICALS IN THE GREAT LAKES HAS ALSO REQUIRED ISSUANCE OF FISH CONSUMPTION ADVISORIES; AND, ALONG THE LONG ISLAND-ATLANTIC COAST, THE PRESENCE OF PATHOGENS HAVE LED TO CLOSING OF SHELLFISH BEDS.

POINT SOURCE DISCHARGES FROM MUNICIPAL AND INDUSTRIAL FACILITIES, COMBINED SEWER OVERFLOWS AND STORMWATER RUNOFF ARE THE PRIMARY CAUSES OF THESE WATER QUALITY PROBLEMS. WE HAVE PROGRESSED TOWARD ALLEVIATING AND EVENTUALLY ELIMINATING THESE POLLUTANT SOURCES THROUGH INDEPENDENT STATE EFFORTS AND UNDER THE AUSPICES OF TWO FEDERALLY-SPONSORED PROGRAMS, THE NATIONAL ESTUARY PROGRAM AND THE GREAT LAKES INITIATIVE. IN CONSIDERING CONGRESSMAN STUDDS' COASTAL DEFENSE INITIATIVE AND THROUGH REAUTHORIZATION OF THE CZMA, THE CONGRESS IS NOW PROPERLY ASKING WHAT OTHER FEDERAL AND STATE RESOURCES CAN BE MARSHALED TO EXPEDITE ELIMINATION OF THESE THREATS TO THE QUALITY OF OUR COASTAL WATERS.

THESE BILLS DIFFER FROM CURRENT FEDERAL PROGRAMS IN THEIR EXPLICIT RECOGNITION THAT LAND USE CANNOT BE IGNORED AS A CONTRIBUTOR TO EXISTING COASTAL WATER POLLUTION, NOR CAN LAND USE BE IGNORED IN THE PREVENTION OF FUTURE DEGRADATION. FOR EXAMPLE, DECISIONS ALLOWING LARGE-SCALE RESIDENTIAL HOUSING DEVELOPMENT CAN RESULT IN INCREASED POLLUTANT LOADINGS INTO WATER BODIES FROM STORMWATER RUNOFF. LAND USE DECISIONS SHOULD ALSO TAKE INTO ACCOUNT THE ABILITY OF THE SEWAGE SYSTEM INFRASTRUCTURE TO TRANSMIT AND TREAT WASTEWATER; OFTEN TIMES THESE CONSIDERATIONS

ARE NOT FACTORED INTO LOCAL DECISIONMAKING DESPITE THEIR POTENTIAL WATER QUALITY IMPACTS. IN HR 2647, STATES ARE REQUIRED TO DEVELOP PROGRAMS TO MEET WATER QUALITY STANDARDS AND MUST COORDINATE THAT PLANNING WITH THE PROCESS CALLED FOR IN HR 4030 WHICH FOCUSES ON LAND USE. THIS SINGLE, COMPREHENSIVE MANAGEMENT FRAMEWORK FOR COASTAL PROTECTION INTEGRATES REGULATORY AND ENFORCEMENT ASPECTS OF WATER QUALITY MANAGEMENT WITH SOUND LAND AND RESOURCE MANAGEMENT. AS WE KNOW, MR. CHAIRMAN, LIMITED STATE AND FEDERAL RESOURCES DICTATE THAT EVERY DOLLAR DEDICATED TO COASTAL PROBLEMS MUST BE PRUDENTLY SPENT. IT IS POSSIBLE THAT THE LEGISLATION UNDER DISCUSSION TODAY WILL ELIMINATE REDUNDANCIES AND DUPLICATION, ALLOWING FOR CONCENTRATION IN AREAS LACKING NECESSARY ATTENTION. NEW YORK HAS ALREADY BEGUN COMPREHENSIVE PLANNING; AND, WHILE SOME ADJUSTMENTS MAY BE NECESSARY, THE PLANNING ALREADY UNDERWAY IS COMPATIBLE WITH THAT REQUIRED IN BOTH BILLS.

IN HR 4030, WE SUPPORT THE PROPOSED NATIONAL INTEREST IMPROVEMENT PROGRAM FOR COASTAL STATES TO ASSIGN PRIORITIES FOR A VARIETY OF COASTAL MANAGEMENT NEEDS. WE ALSO SUPPORT THE PROPOSED LEGISLATIVE CLARIFICATIONS, PARTICULARLY THOSE RELATED TO THE FEDERAL CONSISTENCY PROCESS.

TURNING TO HR 2647, I SHOULD FIRST SAY THAT CONGRESSMAN STUDDS AND HIS STAFF HAVE GONE TO GREAT LENGTHS TO ACCOMMODATE NEW YORK'S SUGGESTIONS FOR STRENGTHENING THE BILL. WE VERY MUCH APPRECIATE HIS WILLINGNESS TO CONSIDER OUR CONCERNS AND WE BELIEVE HIS BILL AS REPORTED FROM THE HOUSE MERCHANT MARINE AND FISHERIES

COMMITTEE REPRESENTS A MAJOR ACCOMPLISHMENT. AMONG ITS MANY STRONG PROVISIONS IS AN AMENDMENT BY CONGRESSWOMAN LOWEY WHICH EXTENDS THE NATIONAL ESTUARY PROGRAM AND ESTABLISHES AN IMPLEMENTATION PHASE AND ADDITIONAL FUNDING FOR THAT PROGRAM. THE CREATION OF A LONG ISLAND SOUND OFFICE WITHIN EPA WILL ASSIST THE MANAGEMENT CONFERENCE IN THE IMPLEMENTATION OF THE MANAGEMENT PLAN WHICH IS SCHEDULED FOR COMPLETION IN 1991. SOME AREAS THAT DESERVE ADDITIONAL ATTENTION ARE AS FOLLOWS:

(1) IN SECTION 202, DEALING WITH COASTAL WATER QUALITY CRITERIA AND STANDARDS, EPA SHOULD BE REQUIRED TO PROMULGATE NATIONAL STANDARDS FOR STATES WHICH HAVE NOT DONE SO CONSISTENT WITH CURRENT PROVISIONS OF THE CLEAN WATER ACT.

(2) IN SECTION 204, CONCERNING OUTSTANDING COASTAL RESOURCE WATERS, DESIGNATIONS SHOULD BE MADE USING EXISTING PROVISIONS OF THE CWA. ALSO, RESPONSIBILITY FOR THE PROGRAM AT THE STATE LEVEL SHOULD REST WITH THE WATER QUALITY AGENCY.

(3) IN SECTION 205, PERTAINING TO COASTAL DISCHARGE CRITERIA, WE ARE CONCERNED ABOUT THE IMPACT OF THE CHANGES ON ESTUARIES DESIGNATED UNDER CLEAN WATER ACT SECTION 320. CHANGING DISCHARGE CRITERIA AT THIS TIME COULD UPSET COURT ORDERS WHICH ARE PREDICATED UPON THE CURRENT REQUIREMENTS.

(4) IN SECTION 206, MARINE SANITATION DEVICES, WE REQUEST AN AMENDMENT THAT WOULD BE CONSISTENT WITH MOST CLEAN WATER ACT

PROGRAMS -- TO ALLOW STATES TO ADOPT MEASURES MORE STRINGENT THAN FEDERAL DICTATES.

MR. CHAIRMAN, IT MUST BE NOTED THAT WHILE HR 2647 AND HR 4030 ARE WELL-CONSIDERED AND SUPPORTABLE, THERE ARE ISSUES NOT ADDRESSED IN EITHER BILL WHICH MAY REDUCE THEIR EFFECTIVENESS IN COMBATING COASTAL WATER POLLUTION. THESE ISSUES ARE AS FOLLOWS:

(1) EFFLUENT STANDARDS.

ONE OF THE STRENGTHS OF THE CLEAN WATER ACT IS THAT IT ESTABLISHED A TWO-PRONGED APPROACH TO ATTAINING THE FISHABLE/SWIMMABLE GOALS OF THE ACT. THIS APPROACH RELIES UPON ESTABLISHING WATER QUALITY STANDARDS AND DEVELOPING TECHNOLOGY-BASED TREATMENT REQUIREMENTS. THESE TWO IMPORTANT ASPECTS OF THE ACT MUST BE EMPHASIZED BECAUSE THE STANDARDS STILL IN USE BY EPA HAVE NOT KEPT PACE WITH TODAY'S TECHNOLOGY.

WHILE HR 2647 PLACES RENEWED EMPHASIS ON THE DEVELOPMENT OF WATER QUALITY CRITERIA AND STANDARDS, WE MUST EMPHASIZE THAT EPA MUST ALSO MOVE PROMPTLY TO DEVELOP BEST AVAILABLE TECHNOLOGY (BAT) AND CATEGORICAL PRETREATMENT REQUIREMENTS FOR THE REMAINING SIGNIFICANT INDUSTRIAL EFFLUENT CATEGORIES, AS WELL AS TO UPDATE EXISTING REQUIREMENTS TO REFLECT CURRENT TECHNOLOGY. WHILE EPA'S DEVELOPMENT OF BAT AND CATEGORICAL PRETREATMENT REQUIREMENTS DO NOT REQUIRE LEGISLATION, THE NEED FOR EPA ACTION IS IMPERATIVE TO ATTAINING CWA GOALS.

(2) COMBINED SEWER OVERFLOWS (CSOs).

THE CONTRIBUTION OF CSOs TO WATER QUALITY PROBLEMS IN MAJOR NEW YORK METROPOLITAN AREAS AND IN COASTAL AREAS IS WELL KNOWN. NEW YORK HAS BEEN ADDRESSING CSO POLLUTION SINCE THE 1960s BY CONCENTRATING ON ELIMINATION OF DRY WEATHER OVERFLOWS AND THE CONTROL OF SOLID AND FLOATABLE MATERIALS IN CSO DISCHARGES. THE EPA HAS RECENTLY RELEASED A CSO CONTROL STRATEGY WHICH WE BELIEVE HAS MERIT AND IS WORTHY OF CONGRESSIONAL ATTENTION, PARTICULARLY IN THE CONTEXT OF COASTAL WATER QUALITY PROGRAMMING. A CONGRESSIONAL DICTATE ALONG THE LINES OF THE EPA PROPOSAL, THAT IS, TO REQUIRE ELIMINATION OF DRY WEATHER OVERFLOWS AND TO MINIMIZE CSO DISCHARGES, WOULD GREATLY ASSIST IN REMEDIATING THE COASTAL WATERS WHERE CSOs ARE OCCURRING NOW AND WHERE THEY WILL CONTINUE ABSENT GOVERNMENT ATTENTION. HOWEVER, LIMITED PUBLIC RESOURCES REQUIRE GOVERNMENT TO RECOGNIZE THAT CSO-CAUSED USE IMPAIRMENTS VARY IN SEVERITY AND THAT SOME SORT OF PRIORITY RANKING SYSTEM MUST BE DEVELOPED FOR USE IN SETTING PERMIT AND EXPENDITURE REQUIREMENTS.

(3) PROGRAM FUNDING.

MR. CHAIRMAN, I ACKNOWLEDGE THAT THE SUBCOMMITTEE'S JURISDICTION IS IN SETTING AUTHORIZED LEVELS OF FUNDING RATHER THAN IN MAKING ACTUAL APPROPRIATIONS FOR CARRYING OUT THE PURPOSES OF THE CLEAN WATER ACT. HOWEVER, PLEASE BEAR IN MIND THE HISTORY

OF CONGRESSIONALLY-MANDATED PROGRAMS WHICH ARE WELL-INTENTIONED BUT OFTEN CARRY MUCH FEWER DOLLARS FOR STATE IMPLEMENTATION THAN WAS ANTICIPATED AT THE TIME OF THEIR CONCEPTION. BOTH THE BILLS UNDER CONSIDERATION HERE TODAY PROPOSE WHAT APPEARS TO BE FUNDING SUFFICIENT TO REALIZE THEIR STATED OBJECTIVES. HOWEVER, BOTH BILLS IMPOSE NEW RESPONSIBILITIES ON STATE GOVERNMENTS WHICH CANNOT BE MET IF FEDERAL APPROPRIATIONS DO NOT MATCH AUTHORIZED LEVELS. WE ASK THAT IF THESE BILLS ARE ENACTED IN THEIR CURRENT FORM, THIS SUBCOMMITTEE DO ALL IT CAN TO ENSURE THAT NEW PROGRAMS ARE PROPERLY FUNDED.

IN CONCLUSION, LET ME ONCE AGAIN THANK YOU FOR THIS OPPORTUNITY TO ADDRESS COASTAL WATER QUALITY ISSUES AND THE PROPOSED LEGISLATION. BOTH BILLS ARE IMPORTANT; IN PARTICULAR, REAUTHORIZATION OF THE COASTAL ZONE MANAGEMENT ACT THIS YEAR IS CRITICAL TO ALLOWING CONTINUATION OF THESE IMPORTANT SERVICES. WE APPRECIATE YOUR EFFORTS TO EXPEDITE CONSIDERATION OF THIS MEASURE.

THIS CONCLUDES MY TESTIMONY. I WOULD BE HAPPY TO RESPOND TO ANY QUESTIONS YOU HAVE REGARDING MY TESTIMONY OR TO PROVIDE ANY ADDITIONAL INFORMATION YOU OR YOUR STAFF MAY NEED.

STATEMENT OF CONLEY MOFFETT, DEPUTY ASSISTANT DIRECTOR FOR FISH AND WILDLIFE ENHANCEMENT, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, BEFORE THE HOUSE PUBLIC WORKS AND TRANSPORTATION COMMITTEE, SUBCOMMITTEE ON WATER RESOURCES, CONCERNING COASTAL POLLUTION

MAY 9, 1990

MR. CHAIRMAN, I AM CONLEY MOFFETT, DEPUTY ASSISTANT DIRECTOR OF THE U.S. FISH AND WILDLIFE SERVICE. I AM PLEASED TO BE HERE TODAY TO DISCUSS THE IMPACTS OF COASTAL POLLUTION ON FISH AND WILDLIFE AND THE SERVICE'S ROLE IN PROTECTING COASTAL RESOURCES.

AS YOU KNOW, THE MISSION OF THE SERVICE IS TO "CONSERVE, PROTECT, AND ENHANCE FISH AND WILDLIFE AND THEIR HABITATS." OUR TRUST RESOURCES INCLUDE LANDS THAT WE MANAGE -- SUCH AS THE NATIONAL WILDLIFE REFUGE SYSTEM, COMPRISING MORE THAN 89 MILLION ACRES -- MIGRATORY BIRDS, CERTAIN ENDANGERED SPECIES AND THEIR CRITICAL HABITATS, CERTAIN ANADROMOUS GREAT LAKES FISHES, AND SOME MARINE MAMMALS. WE ALSO HAVE THE RESPONSIBILITY TO ADMINISTER THE 1982 COASTAL BARRIER RESOURCES ACT, WHICH IS AIMED AT CONSERVING NEARSHORE HABITAT FOR COASTAL RESOURCES. AS A RESULT OF THESE TRUST RESPONSIBILITIES, WE ARE INVOLVED IN WATER QUALITY ISSUES THAT MAY AFFECT FRESHWATER AND COASTAL FISH AND WILDLIFE AND THEIR ASSOCIATED HABITATS. AT THE START, I WOULD LIKE TO POINT OUT THAT, EXCEPT FOR ANADROMOUS FISH AND MIGRATORY BIRDS, OUR RESPONSIBILITIES LIE PRIMARILY INLAND OF THE COASTLINE AND INCLUDE COASTAL WATERSHEDS, WHILE NOAA IS RESPONSIBLE FOR MARINE FISH AND MAMMALS FOUND SEAWARD OF THE COASTLINE.

IN ADDITION TO A CLEAR LEGISLATIVE MANDATE FOR THIS INVOLVEMENT, THE SERVICE HAS A LONG HISTORY OF LEADERSHIP IN COASTAL RESOURCE

MANAGEMENT. OVER THE YEARS MANY SERVICE EFFORTS HAVE FOCUSED ON COASTAL RESOURCE ISSUES INCLUDING:

- PIONEERING WORK ON THE EFFECTS OF ENVIRONMENTAL CONTAMINANTS ON MIGRATORY BIRDS INCLUDING BROWN PELICANS, OSPREY, BALD EAGLES, AND PEREGRINE FALCONS;
- SERVING AS THE LEAD AGENCY FOR PREPARATION OF THE NATIONAL ESTUARY STUDY DURING THE 1960'S;
- INVOLVEMENT IN REVIEWING STATE COASTAL ZONE MANAGEMENT PLANS PRIOR TO THEIR APPROVAL;
- PREPARING THE NATIONAL WETLANDS INVENTORY AND OTHER COASTAL HABITAT MAPPING ACTIVITIES; AND, MORE RECENTLY,
- INVESTIGATING THE DECLINE OF ATLANTIC COASTAL STRIPED BASS AND PARTICIPATING IN EPA'S NATIONAL ESTUARY PROGRAM.

THE CONTAMINANTS PROBLEM

THE SERVICE'S MISSION RELATIVE TO POLLUTING ACTIVITIES IS "TO PREVENT, AND WHEN NECESSARY, MITIGATE THE ADVERSE IMPACTS OF ENVIRONMENTAL POLLUTION ON THE NATION'S FISH AND WILDLIFE RESOURCES AND THEIR HABITATS." UNFORTUNATELY, THERE IS NO SHORTAGE OF PROBLEMS. ACCORDING TO EPA, SEWAGE TREATMENT PLANTS DISCHARGE 9.5 BILLION GALLONS OF TREATED EFFLUENT DIRECTLY INTO OUR ESTUARIES AND NEARSHORE WATERS EVERY DAY, AND INDUSTRIAL AND COMMERCIAL FACILITIES DISCHARGE AN ADDITIONAL 3.2 BILLION GALLONS OF TREATED EFFLUENT DAILY. IT HAS BEEN ESTIMATED THAT NONPOINT SOURCES MAY BE RESPONSIBLE FOR UP TO 50 PERCENT OF THE CONTAMINANTS INPUT INTO COASTAL WATERS.

AS A RESULT, CHEMICAL CONTAMINATION OF COASTAL AND SURFACE WATERS AND BOTTOM SEDIMENTS IS WIDESPREAD. THIRTY-EIGHT STATES, INCLUDING SIXTEEN COASTAL STATES, HAVE ISSUED CONSUMPTION ADVISORIES DUE TO CONTAMINATION OF FISH, AND AT LEAST TWO GREAT

LAKES STATES HAVE ISSUED CONSUMPTION ADVISORIES FOR WATERFOWL. NATIONWIDE, POPULATIONS OF WATERFOWL AND MANY RECREATIONAL AND COMMERCIAL FISHERIES ARE DECLINING. RESOURCE PROBLEMS DUE TO CONTAMINANTS ARE KNOWN OR SUSPECTED ON APPROXIMATELY 40 PERCENT OF OUR 477 WILDLIFE REFUGES.

SERVICE ACTIVITIES

AMONG THE FEDERAL AGENCIES, THE SERVICE HAS SIGNIFICANT CAPABILITIES AND EXPERTISE TO RESPOND TO COASTAL POLLUTION PROBLEMS. THESE INCLUDE A NETWORK OF 160 COASTAL NATIONAL WILDLIFE REFUGES, FISHERY ASSISTANCE OFFICES THAT DEAL WITH ANADROMOUS AND INTERJURISDICTIONAL FISHERIES, AND 31 COASTAL FISH AND WILDLIFE ENHANCEMENT FIELD OFFICES. THESE FIELD OFFICES REVIEW PERMIT APPLICATIONS AND FEDERAL PROJECTS, ANALYZE THE EFFECTS OF PROPOSED ACTIVITIES ON ENDANGERED SPECIES, EVALUATE STATE NONPOINT SOURCE MANAGEMENT PLANS, AND IDENTIFY, ASSESS, AND MITIGATE CONTAMINANT IMPACTS ON FISH AND WILDLIFE.

THE SERVICE ALSO HAS SEVEN RESEARCH CENTERS THAT HAVE A SIGNIFICANT COASTAL RESOURCE ORIENTATION AND IS RESPONSIBLE FOR THE NATIONAL WETLANDS INVENTORY AND SEVERAL SITE-SPECIFIC PROGRAMS. THESE REGIONAL ACTIVITIES INCLUDE THE ALASKA MARINE AND COASTAL BIRD PROJECT, A MAJOR GREAT LAKES EFFORT, THE CHESAPEAKE BAY PROGRAM AND SMALLER EFFORTS IN THE NORTHEAST ESTUARIES, THE CONNECTICUT RIVER, DELAWARE BAY, ALBEMARLE-PAMLICO SOUND, GALVESTON BAY, SAN FRANCISCO BAY, THE COLUMBIA RIVER ESTUARY, AND PUGET SOUND.

AS A RESULT OF THESE EFFORTS AND THOSE OF OTHER FEDERAL AND STATE AGENCIES AND UNIVERSITIES, THE BODY OF INFORMATION DOCUMENTING THE IMPACTS OF COASTAL POLLUTION ON FISH AND WILDLIFE IS GROWING. OUR NATIONAL CONTAMINANT MONITORING PROGRAM HAS CONFIRMED THAT, WHILE LEVELS OF MANY CONTAMINANTS ARE DECLINING, UNACCEPTABLY HIGH LEVELS OF SOME CONSTITUENTS CONTINUE TO ADVERSELY AFFECT FISH AND WILDLIFE. POLYCHLORINATED BIPHENYLS (PCBs), POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs), ORGANOCHLORINE PESTICIDES, AND CERTAIN METALS ARE OF PARTICULAR CONCERN DUE TO THEIR UBIQUITOUS NATURE; THEIR PROPENSITY TO ACCUMULATE IN FISH, MAMMALS, AND BIRDS; AND THEIR EFFECT ON FISH AND WILDLIFE RESOURCES. MANY OF THESE COMPOUNDS TEND TO PERSIST IN SEDIMENTS, AND MAY CONTINUE TO CIRCULATE THROUGH AQUATIC SYSTEMS FOR YEARS TO COME. CONTAMINANTS AFFECT FISH AND WILDLIFE IN SEVERAL WAYS INCLUDING MORTALITY, IMPAIRED REPRODUCTIVE SUCCESS, BIRTH DEFECTS, SKIN LESIONS, TUMORS AND LIVER DISORDERS.

ONE OF THE MOST OBVIOUS EFFECTS OF CONTAMINANTS ON FISH IS THE DEVELOPMENT OF TUMORS. SKIN, LIP, AND LIVER TUMORS ARE MOST FREQUENT, AND, AT MANY LOCATIONS, ELEVATED FREQUENCIES COINCIDE WITH HIGH LEVELS OF CHEMICAL CONTAMINATION. LIVER TUMORS, ALONE, HAVE BEEN FOUND IN AT LEAST 13 SPECIES OF FISH FROM HARBORS AND ESTUARIES ON OUR ATLANTIC, PACIFIC, AND GREAT LAKES COASTS. RECENT EVIDENCE ALSO SUGGESTS THAT HIGH PREVALENCES OF LIVER TUMORS MAY HAVE AN ADVERSE EFFECT UPON THE AGE STRUCTURE OF THE AFFECTED FISH POPULATIONS BY INCREASING MORTALITY IN OLDER FISH.

REPRODUCTIVE SUCCESS OF FISH MAY ALSO BE REDUCED BY EXPOSURE TO ENVIRONMENTAL CONTAMINANTS. FOR EXAMPLE, RESEARCH CONDUCTED BY

OUR GREAT LAKES FISHERIES RESEARCH CENTER FOUND THAT EGGS FROM LAKE MICHIGAN LAKE TROUT HATCH AT LOWER RATES THAN THOSE FROM THE LESS POLLUTED LAKES SUPERIOR AND HURON. THESE RESULTS SUGGEST THAT CONTAMINANT-INDUCED MORTALITY COULD BE CONTRIBUTING TO THE FAILURE OF HATCHERY PLANTED LAKE TROUT TO SUCCESSFULLY REPRODUCE IN LAKE MICHIGAN. LIKEWISE, POPULATION DECLINES OF STRIPED BASS ON THE ATLANTIC COAST AND IN SAN FRANCISCO BAY HAVE BEEN BLAMED, IN PART, ON CONTAMINANT IMPACTS ON LARVAL FISH.

RESEARCH BY OUR COLUMBIA NATIONAL FISHERIES RESEARCH CENTER ON CHESAPEAKE BAY STRIPED BASS HAS FOUND PCBs, PAHs, ORGANOCHLORINE PESTICIDES, AND METALS IN EGGS, LARVAE, AND ADULTS. LARVAE WERE FOUND TO BE VERY SENSITIVE TO ALUMINUM AND ACIDITY. A STUDY CONDUCTED ON STRIPED BASS FROM THE SAN FRANCISCO BAY-DELTA SYSTEM FOUND THAT HIGH LEVELS OF PCBs, PAHs, DDT, AND METALS IN ADULTS CORRELATED STRONGLY WITH IMPAIRED REPRODUCTION. THE PRESENCE OF CONTAMINANTS IN FISH CAN ALSO RENDER THEM UNDESIRABLE FOR HUMAN CONSUMPTION. SIXTEEN COASTAL STATES AND ALL EIGHT GREAT LAKES STATES HAVE CONSUMPTION ADVISORIES IN EFFECT FOR "COASTAL" FISHERY RESOURCES. WATERFOWL IN CERTAIN GREAT LAKES AND COASTAL STATES ALSO CONTAIN CONTAMINANT LEVELS ABOVE HEALTH ADVISORY GUIDELINES FOR POULTRY.

ABNORMAL DEVELOPMENT, INCLUDING CROSSED BILLS, HAVE BEEN DOCUMENTED IN FORSTER'S TERNS, COMMON TERNS, HERRING GULLS, DOUBLE-CRESTED CORMORANTS, AND VIRGINIA RAILS NEAR THE GREAT LAKES. SIMILAR DEFORMITIES HAVE BEEN ASSOCIATED WITH EXPOSURE TO DIOXINS AND PCBs. ACCUMULATION OF HIGH CONCENTRATIONS OF PCBs, DIOXINS, AND FURANS HAVE ALSO BEEN LINKED TO REPRODUCTIVE

IMPAIRMENT IN COASTAL POPULATIONS OF FISH-EATING BIRDS AND MAMMALS. BALD EAGLES THAT NEST ALONG OR NEAR THE GREAT LAKES SHORELINES HAVE POOR REPRODUCTION AND HIGH CONTAMINANT CONCENTRATIONS COMPARED TO INLAND POPULATIONS. THE PERCENTAGE OF OCCUPIED BREEDING AREAS PRODUCING FLEDGED YOUNG AND THE NUMBER OF FLEDGED YOUNG PER OCCUPIED BREEDING AREA ARE SIGNIFICANTLY LOWER FOR SHORELINE NESTING EAGLES.

SIMILARLY, FORSTER'S TERNS NESTING ON GREEN BAY HAVE SIGNIFICANTLY LOWER REPRODUCTIVE SUCCESS AND HIGHER BODY BURDENS OF CONTAMINANTS THAN BIRDS NESTING IN AN UNCONTAMINATED INLAND SITE. HATCHABILITY, HATCHING WEIGHT, INCUBATION TIME, LIVER WEIGHT, AND NEST ABANDONMENT WERE ALL ADVERSELY AFFECTED AT THE CONTAMINATED SITE.

IN RESPONSE TO THE INCREASING THREAT TO OUR TRUST RESOURCES, THE SERVICE HAS EXPANDED ITS ENVIRONMENTAL CONTAMINANTS PROGRAM TO PROVIDE A FOCAL POINT FOR CONTAMINANT-RELATED SERVICE ACTIVITIES. HOWEVER, CONTAMINANT PROBLEMS AFFECT VIRTUALLY EVERY FACET OF THE SERVICE'S PROGRAMS, AND REQUIRE CLOSE COOPERATION BETWEEN ALL OF OUR FUNCTIONS.

CONTAMINANT BIOLOGISTS IN EACH OF OUR ENHANCEMENT FIELD OFFICES WORK CLOSELY WITH OTHER SERVICE ENTITIES TO DOCUMENT THE PRESENCE OF CONTAMINANTS IN THE ENVIRONMENT, ASSESS THE REAL OR POTENTIAL EFFECTS ON FISH AND WILDLIFE AND THEIR HABITATS, AND TAKE ACTIONS TO PREVENT OR REMEDIATE SUCH PROBLEMS. WE CURRENTLY HAVE ABOUT 140 STUDIES UNDERWAY BOTH ON AND OFF SERVICE LANDS, INCLUDING:

- PLANNING AND CONDUCTING PRELIMINARY NATURAL RESOURCE SURVEYS;

- COLLECTING ENVIRONMENTAL SAMPLES FOR CHEMICAL ANALYSIS;
- SITE-SPECIFIC CONTAMINANT INVESTIGATIONS;
- REMEDIATION STUDIES AT SUPERFUND SITES;
- REVIEWING STATE WATER QUALITY STANDARDS AND CERTIFICATIONS, AND NONPOINT SOURCE PLANS;
- COMMENTING ON DREDGE AND FILL PERMITS AND NPDES PERMITS; AND
- PROVIDING TECHNICAL ASSISTANCE TO VARIOUS FEDERAL, STATE, AND LOCAL AGENCIES ON POLLUTION ISSUES RELATING TO FISH AND WILDLIFE.

DAMAGE ASSESSMENT STUDIES

NATURAL RESOURCE DAMAGE ASSESSMENT WORK RELATED TO HAZARDOUS SUBSTANCE RELEASES AND OIL SPILLS ALLOWS THE SERVICE AN OPPORTUNITY TO RECOVER MONEY FROM RESPONSIBLE PARTIES TO RESTORE LOST OR DAMAGED NATURAL RESOURCES. AS A TRUSTEE, THE SERVICE MUST DEMONSTRATE CONTAMINANT EFFECTS ON TRUST RESOURCES, ESTABLISH A LINK BETWEEN DOCUMENTED EFFECTS AND THE RELEASE OR SPILL, AND DETERMINE THE EXTENT OF DAMAGES AND THE NECESSARY RESTORATION COSTS.

THE SERVICE, IN COOPERATION WITH OTHER TRUSTEES, HAS BEEN SUCCESSFUL IN ACHIEVING SUBSTANTIAL BENEFITS TO COASTAL FISH AND WILDLIFE RESOURCES THROUGH RECENT DAMAGE ASSESSMENT WORK. EXTENSIVE WETLAND RESTORATION WORK IN SAN FRANCISCO BAY WILL BE CONDUCTED WITH THE NEARLY $12 MILLION IN DAMAGES PAID AS THE RESULT OF AN OIL SPILL. IN THE NORTHEAST AND MIDDLE ATLANTIC STATES, WETLAND RESTORATION AND AMERICAN SHAD RESTORATION EFFORTS WILL BE ENHANCED AS THE RESULT OF SETTLEMENTS IN EXCESS OF $225,000. AN OIL SPILL IN THE SAVANNAH RIVER RESULTED IN $1.2

MILLION IN COMPENSATION, WHICH WILL BE USED IN PART TO RESTORE RIPARIAN WETLANDS.

THE SERVICE AND THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ARE PRESENTLY INVESTIGATING POTENTIAL NATURAL RESOURCE DAMAGES IN THE HUDSON RIVER, PUGET SOUND, SAN FRANCISCO BAY, AND PRINCE WILLIAM SOUND, WHERE WE MAY BE ABLE TO RECOVER DAMAGES TO RESTORE LOST NATURAL RESOURCES. WE ALSO WORK CLOSELY WITH THE ENVIRONMENTAL PROTECTION AGENCY TO ACHIEVE MAXIMUM BENEFITS TO FISH AND WILDLIFE ASSOCIATED WITH CLEANUPS AT SUPERFUND SITES.

POLLUTION MITIGATION AND HABITAT RESTORATION ACTIVITIES ARE UNDERWAY ON MANY OF OUR NATIONAL WILDLIFE REFUGES AND ARE PART OF THE DEPARTMENT OF INTERIOR'S IRRIGATION DRAINWATER PROGRAM. EXTENSIVE POLLUTION-RELATED EFFECTS, RANGING FROM CONTAMINATION OF FISH AND WILDLIFE AND THEIR HABITAT, TO DEFORMITIES IN PELICANS AND WATERFOWL EMBRYOS, WATERFOWL MORTALITY, AND NESTING FAILURE HAVE ALREADY BEEN DOCUMENTED AT MANY IRRIGATION DRAINWATER SITES. DETAILED STUDIES ARE BEING CONDUCTED TO DETERMINE THE GEOGRAPHIC EXTENT AND SEVERITY OF WATER QUALITY PROBLEMS AND TO PROVIDE THE SCIENTIFIC UNDERSTANDING TO DEVELOP REASONABLE ALTERNATIVES TO MITIGATE OR RESOLVE PROBLEMS.

SPECIFIC ESTUARY PROGRAMS

RECENT SERVICE EFFORTS IN THE CHESAPEAKE BAY AND OTHER ESTUARIES HAVE ENHANCED OUR CAPABILITY TO PROTECT COASTAL FISH AND WILDLIFE RESOURCES. FOR EXAMPLE, OUR CHESAPEAKE BAY OFFICE WORKS

COOPERATIVELY WITH OTHER SERVICE OFFICES AND OTHER FEDERAL, STATE, AND LOCAL ENTITIES TO UNDERTAKE ACTIVITIES TO PROTECT AND RESTORE BAY FISH AND WILDLIFE. THE SERVICE EFFORT FOCUSES ON THREE MAJOR AREAS -- LIVING RESOURCES, WATER QUALITY, AND PUBLIC AWARENESS.

SPECIFIC PROJECTS ARE DIRECTED AT:

- IDENTIFYING THE CAUSES OF DECLINES IN SUBMERGED AQUATIC VEGETATION, WATERFOWL, AND CERTAIN ANADROMOUS FISH;
- DEVELOPING MANAGEMENT PLANS FOR THEIR PROTECTION AND RESTORATION;
- ASSESSING AND REDUCING THE EFFECTS ON POINT AND NONPOINT SOURCES OF POLLUTION ON BAY FISH AND WILDLIFE; AND
- EDUCATING THE PUBLIC ON THE VALUE OF BAY RESOURCES, ENVIRONMENTAL THREATS, AND ACTIONS INDIVIDUALS CAN TAKE TO HELP PROTECT THOSE VALUABLE RESOURCES.

BECAUSE OF THE SUCCESS OF THIS PROGRAM, SIMILAR, BUT SMALLER, EFFORTS ARE BEING UNDERTAKEN BY THE SERVICE TO ADDRESS LIVING RESOURCE PROBLEMS IN SOUTHERN NEW ENGLAND ESTUARIES, DELAWARE BAY, ALBEMARLE-PAMLICO SOUND, AND PUGET SOUND.

MR. CHAIRMAN, THAT CONCLUDES MY STATEMENT. AGAIN, I APPRECIATE THE OPPORTUNITY TO TESTIFY, AND I WILL BE PLEASED TO ANSWER ANY QUESTIONS YOU MAY HAVE.

STATEMENT OF
ROBERT WAYLAND
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OFFICE OF WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE SUBCOMMITTEE ON WATER RESOURCES
COMMITTEE PUBLIC WORKS AND TRANSPORTATION
U.S. HOUSE OF REPRESENTATIVES

May 9, 1990

Good morning. I am Robert Wayland, Deputy Assistant Administrator for Water, the U.S. Environmental Protection Agency. I am accompanied by Tudor Davies, Director, Office of Marine and Estuarine Protection. We are pleased to appear before this Committee today to speak to you about the problems of coastal pollution and what the Agency is doing to address these issues.

Under the Clean Water Act (CWA), the Agency's mission is to protect and restore all of the nation's waters, including wetlands. Our base programs, including the setting of water quality criteria and standards, monitoring, permitting, enforcement, and nonpoint source pollution control, are working to achieve that goal. Significant progress has been made; we have invested billions in sewage treatment plant improvements to substantially reduce conventional pollutant loadings; the pretreatment program has matured and is addressing the toxic contribution from industrial users of POTWS; the permits program is addressing toxic pollutant control for both industrial and municipal discharges; the nonpoint source program is providing assistance to the States to help them implement nonpoint source controls; the monitoring program is working with the States to identify waters not meeting designated uses and to target waters for toxics controls; agreements with the Army Corps of Engineers have achieved improved implementation of the dredge and fill disposal programs; and we are beginning to make progress on stormwater discharges and combined sewer overflows. Although progress has been achieved, much remains to be done.

One area receiving more and more attention from EPA and other agencies is our coastal and marine waters. The Office of Technology Assessment's 1987 Report on Wastes in the Marine Environment found that our coastal waters are in "deep trouble" and require immediate attention to prevent further degradation and to restore these waters to good health. The solutions to these problems are complex as many of their causes are land-based and are primarily due to the population growth and development occurring in our coastal zone. At the same time, these coastal waters receive pollutants coming down our rivers. With the majority of our nation's population now living within an hour's drive of our coasts, including the Great Lakes, the urgency of addressing these problems is compelling.

A number of points are important to make at the outset:

- First, the Clean Water Act and Marine Protection, Research, and Sanctuaries Act (Titles I and II) are basically sound statutes that provide EPA, States, and localities with adequate authorities for addressing most traditional marine and coastal sources of pollution (i.e., industrial and municipal wastewater treatment facilities). Technology-based controls are generally in place for these facilities, and our basic strategy is to focus on more stringent controls where needed to protect water quality standards, especially for toxic pollutants.

- Second, any new provisions affecting our programs should be designed to fill gaps in the protection and restoration of coastal waters, including wetlands and other aquatic habitat. They should consider geographic targeting of activities to valuable coastal areas that already exhibit significant water quality problems or waters that are threatened and in need of protection. In these areas, baseline controls are not yet in place for non-traditional sources of pollution (such as nonpoint sources, combined sewer overflows, and stormwater discharges and certain habitat modifications). Our immediate concern in these areas should be to implement specific, available practical controls for the non-traditional sources causing the most serious impacts (while maintaining the current levels of controls on traditional sources) to provide a fairly consistent baseline of controls in these areas.

- Third, problems vary -- region by region and waterbody by waterbody. Any coastal legislation must allow sufficient flexibility for Federal, State, and local authorities to design and implement solutions to regional and local problems. The need exists to have the flexibility at the Federal, State, and local levels to tailor cost-effective solutions to the particular local problems.

- Fourth, protecting our coastal resources will not be an easy task nor will it be inexpensive.

I emphasize these points because they are fundamental to our analysis of all of the related proposed legislation. It is important that any new legislation not disrupt ongoing prevention, implementation, or clean-up efforts. For example, wholesale application of certain requirements, such as pretreatment, may not result in the best use of limited resources to achieve environmental benefits. However, there are other areas where "business as usual" is not sufficient and the tools to combat these problems need to be sharpened.

NATIONAL COASTAL AND MARINE POLICY

EPA has developed an internal National Coastal & Marine Policy which is a consolidated statement of the Agency's goals and objectives for improving coastal and marine environments. The Policy is responsive to the public's concerns about protecting human health and aquatic living resources, and serves as the Agency's framework for action.

Our Policy's goals and objectives focus on recreational uses of our beaches and shoreline, pollution controls to ensure protection of living resources and their habitats, pollution prevention, watershed and development management in cooperation with Coastal Zone Management and local and State agencies, improved coastal science, and international efforts. In order to accomplish these goals emphasis is placed on building partnerships among Federal agencies, State and local governments, interest groups and the public.

COASTAL PROGRAMS - BUILDING PUBLIC AND POLITICAL WILL

Some of EPA's programs already build on the philosophy underlying our Policy. The National Estuary Program (NEP) uses regional, state and local capabilities to address coastal problems in seventeen estuaries and demonstrates various cost-effective approaches that may be applied to estuaries and coastal water bodies nationwide. In particular, the programs emphasize the importance of building grass-roots understanding and support for protecting our coastal resources and of encouraging individuals to take responsibility for pollution and modifying their lifestyles. This "bottom up" process of collaborative problem-solving builds the political and public will to support and pay for environmental protection. We feel it is time to apply the consensus building approaches developed in this Program, as well as other lessons learned, to our expanded Near Coastal Waters program.

The Near Coastal Waters Program represents EPA's commitment to address broader coastal issues and to strengthen the use of our existing regulatory authorities. The Program builds on lessons learned in the NEP and other coastal programs, develops new management and technology transfer techniques, and provides for the flexibility needed to tailor protection and management efforts to the needs of other coastal waters.

HOW THE BASE PROGRAMS ARE ADDRESSING COASTAL PROBLEMS

WATER QUALITY STANDARDS

State water quality standards form the backbone of our surface water programs. If we are to target specific coastal areas that need additional controls, we must rely on water quality standards to help make that judgement. Standards provide the water quality goals for each targeted area, and thereby help us to identify waterbodies that fail to meet our goals and provide a yardstick against which to measure progress toward these goals. In cases where technology based controls are not enough to protect water quality, standards also provide the scientific and regulatory basis for additional control measures.

The water quality standards program is a well established program that is addressing problems on a national scale through a Federal and State partnership. Under this program, the CWA correctly places responsibility on the States to adopt water quality standards to protect the designated uses of their particular water resources. EPA develops basic scientific and technical information and publishes water quality criteria guidance for selected pollutants where the need is the greatest. Fresh and salt water quality criteria are developed separately for each pollutant, and based upon available data values are developed to protect public health and aquatic life. States use these criteria documents in developing their standards, which are approved or disapproved by EPA.

One of EPA's highest FY 1991 water program priorities is to encourage and work with the States to extend water quality standards to coastal areas. The 1987 Clean Water Act Amendments already mandate that States adopt standards for those priority toxic pollutants for which EPA has published criteria if the pollutant could reasonably be expected to interfere with beneficial uses of the waters. Thus far we have published salt water human health criteria for 62 pollutants and salt water aquatic life criteria for 25 pollutants. States are making significant progress in meeting the mandate to adopt these existing criteria. While few States have so far adopted the salt water human health standards, 21 of the 28 marine coastal States now have saltwater standards protecting aquatic life.

Another high priority in our program is to develop more salt water aquatic life criteria. However, this work competes with other important criteria development work for wetlands, sediments, and ecological or biological resources which also expands protections for coastal areas. We therefore must carefully select our priorities for all criteria development and choose the specific pollutants that are most important to address. In choosing specific pollutants for criteria development, we will employ a quantitative pollutant ranking system, taking into account a wide array of sources of information, such as the Toxics Release Inventory and the Discharger Assessment Report, which will identify pollutants of concern in estuarine and coastal waters. We are in the final stages of updating our pollutant ranking system.

Development of salt water criteria generally takes longer than fresh water criteria because limited research has been done on them to date. Currently, our resources allow development of criteria documents for 4 to 5 pollutants per year. We expect to propose six new criteria in the near future, five of which will include salt water values.

Under the Statute and our regulations, every three years States must review their standards to see if they need to be expanded or updated. This would include consideration of new criteria documents issued by EPA. States should adopt a salt water standard for each pollutant that could reasonably be expected to interfere with achieving designated waterbody uses.

In addition to our traditional water quality criteria, work is proceeding on the development of fresh and salt water criteria for sediments. Over the next several years, we plan to propose sediment criteria for public review and comment. Our initial sediment criteria will be for a group of organic pollutants. With the interest shown in our work by the States, we anticipate that the adoption of sediment criteria will be a high State priority in both marine states and the Great Lakes states.

To fully evaluate and protect the physical, chemical, and biological integrity of the Nation's water, EPA recognizes that it must go beyond these two types of water quality criteria. To that end, we are developing ecological assessment tools for use in establishing biological water quality standards and determining the overall ecological health of the waterbody. Such approaches might include indices of biological integrity such as presence and richness of aquatic animals and plants. We recently issued initial program guidance to assist States in adopting narrative biological standards for critical aquatic resources in their next review of water quality standards that begins in FY 1991.

NONTRADITIONAL SOURCES OF POLLUTION

In large measure, the focus of the water quality protection programs under the CWA have been on point source discharges. While significant results have been achieved, it is generally agreed that nontraditional sources, such as nonpoint sources, combined sewer overflows, and stormwater discharges account for a majority of the remaining water quality problems in coastal areas.

Most States are making a good effort to comply with the relatively recent nonpoint source control requirements of Section 319 the CWA. Many States, however, lack the full scientific and technical expertise, resources, and institutional capability to implement and institutionalize nonpoint source controls and evaluate their effectiveness. Coastal States, and local governments, with EPA's assistance, need to encourage improved management of soil resources, and agricultural chemicals and animal wastes, improve and implement effective measures to prevent contaminated urban runoff from impairing water quality; and work with local governments to institutionalize more environmentally sound, cost-effective, land use management practices. For this reason we are working closely with NOAA on nonpoint source opportunities as part of the reauthorization of the Coastal Zone Management Act. In particular, we see real advantages in tying progress in nonpoint source controls over new development to the state authority and federal oversight available under that statute. Similarly, we are looking for ways to work with the Department of Agriculture on farm-related non point source controls.

The immediate need is to implement those practical, feasible mitigation or prevention measures, including nonpoint source Best Management Practices (BMP's), in our most troubled or threatened watersheds, providing for a fairly consistent baseline of controls in those areas. Until we achieve this, we cannot judge whether or where further steps will be necessary. This approach has been quite successful in our point source program, and has been proven to produce significant water quality improvements. Once practical controls are in place, if water quality standards are still not met in particular watersheds, additional controls can be developed to meet water quality standards. However, since calculating limits from standards can be a technically difficult and highly controversial process, it should be reserved for the highest priority areas where reasonable available controls simply will not suffice. We would like to see near term implementation of source controls that are reasonable and practical, while more advanced science and ecological work is developed, refined, and legally adopted for exceptionally difficult problem areas.

Problems with combined sewer overflows (CSO) are well-documented in the coastal areas. EPA has issued a CSO strategy which addresses many of the concerns that legislation before the Congress raises -- basically the need to identify and control through permits combined sewer overflows. We need to work together to develop the most environmentally sound and cost-effective approach to deal with this expensive problem, especially when considering elimination or control of discharges and funding.

In the stormwater area, EPA has proposed regulations which we feel begin to meet the need for addressing the requirements of the 1987 Water Quality Act and the environmental risk associated with stormwater discharges. The proposal seeks to achieve a balance between establishing an effective regulatory mechanism and minimizing the administrative burden assocaited with developoing and processing permit applications of the large number of stormwater discharges. The Clean Water Act also provides authority for EPA and the States to require permitting of stormwater discharges that contribute to water quality standards violations or which contribute significantly to polluting the waters of the United States. We need to consider the extent to which these existing authorities may be effectively used to protect the coastal waters. I'm not sure anyone yet appreciates the magnitude, costliness, and complexity of the job yet ahead of us to deal with existing stormwater permitting authorities.

DREDGED MATERIAL MANAGEMENT

Disposal of dredged material into the aquatic environment is regulated under Section 404 of the Clean Water Act (CWA) in near coastal waters, and Section 103 of the Marine Protection, Sanctuaries and Research Act (MPRSA) in deeper waters.

EPA believes that existing federal statutory authorities that affect dredged material disposal do not need to be amended. However, if any legislative changes are made, they should require application of the same environmental protection standards in both CWA and MPRSA for consistency in protection of all aquatic environments. Statutory changes which create different treatment of dredged material disposal under these two laws may result in less environmentally protective decision-making by making it easier to dispose in some areas than others, regardless of relative adverse effects.

To ensure that decisions made regarding dredged material management are environmentally sound and consistent throughout the aquatic environment, EPA and the Corps are working together on a Dredged Material Disposal Strategy Document and testing manuals for evaluation of dredged material disposal. These efforts are part of a larger overall Agency review of contaminated sediments issues which will be addressed in our testimony before this subcommittee at a hearing scheduled for May 15th.

COASTAL MONITORING AND RESEARCH

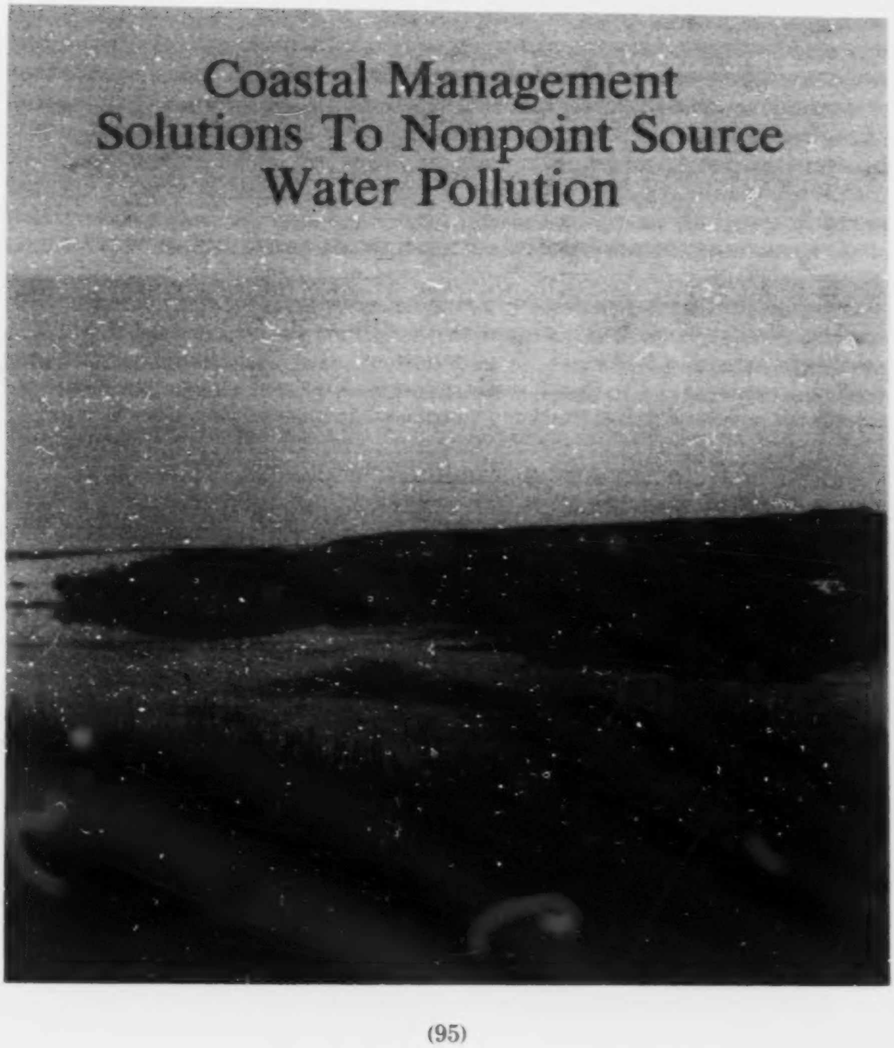
As we examine the approaches to the problems of coastal pollution, we must bear in mind our ability to assess and evaluate not only the problems but the information needed by State and local officials to make management decisions. These decisions include identification of problem areas and the sources of the pollution affecting coastal areas and allocation of resources and funds to cost-effectively address the problems. There are two objectives that are fundamental to a monitoring and research program that would address the information needs of State and local decision makers: 1) characterization of the health of an ecosystem and prediction of trends, and 2) assessment of the effectiveness of management actions. Requiring monitoring and research activities to meet these objectives would link Federal and non-Federal monitoring programs as well as basic and applied scientific research to produce information that would be used to make a difference in the environment.

CONCLUSION

In conclusion, EPA's National Coastal and Marine Policy establishes the framework to address coastal problems and is now being implemented through the geographically targeted coastal programs, the National Estuary and the Near Coastal Waters Programs. In addition, current efforts are underway in the base programs to focus on critical coastal problems and areas where additional and more stringent controls are needed.

Mr Chairman, this concludes my statement. I would be happy to answer any questions that the Subcommittee may have and provide technical assistance in your review of the coastal legislation under consideration by your Committee.

SUBMISSIONS FOR THE RECORD



Coastal Management Solutions To Nonpoint Source Water Pollution

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT
Washington, D.C. 20235

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Nonpoint source pollution control is a major item on the environmental agenda of the Administration and Congress in 1990. The Administration sees an opportunity in the reauthorization of the Coastal Zone Management Act to encourage the coastal states to address this significant source of water pollution. Coastal management programs are in a unique position to deal with the land-based causes of nonpoint source pollution through their existing land management capabilities. Already, we have found that state coastal management programs have developed innovative and successful methods for its control. It is hoped that this document will be of interest and help to states that are faced with similar problems, as well as to individuals interested in the welfare of our Nation's coasts.

The document is organized into five parts. The first part provides a brief overview and summary of nonpoint source pollution and its relation to coastal management. The second part surveys innovative, successful projects undertaken by coastal management programs in eight areas of nonpoint source pollution. The third part provides greater detail on six specific state efforts. The fourth part of this document provides a summary of the Federal coastal management program. This section is primarily intended as background for those individuals unfamiliar with the program. The fifth part contains a list of the state coastal programs.

This Office sincerely thanks the many state program managers who contributed to the information contained in this document.

For further information on activities highlighted in this report, contact the state program manager listed at the end of this document or the Coastal Programs Division, 1825 Connecticut Ave., N.W., Washington, D.C. 20235, Tel. (202) 673-5158.

Sincerely,

Timothy R.E. Keeney
Director

The Cover: This salt pond in Rhode Island is protected by the Coastal Management Progam and the Town of South Kingstown using a variety of nonpoint source pollution controls: development setbacks, vegetative buffers, technical assistance on repairing and maintaining septic systems, stormwater management and runoff controls, reduced zoning density and continued monitoring.

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I. INTRODUCTION: NONPOINT SOURCE POLLUTION AND COASTAL MANAGEMENT

What is nonpoint source pollution?

Nonpoint source pollution is defined as all pollution entering the surface water system other than from pipes. Examples include: soil eroding into streams, agriculture fertilizer seeping into creeks, failing septic systems polluting bays, and runoff from parking lots into adjacent rivers. Discharges from sewage treatment plants and factories, on the other hand, are called "point source" pollution, because they come from a single point--usually a pipe.

How significant is nonpoint source pollution?

Nonpoint sources contribute more than half of the suspended solids, phosphorus, chromium, copper, lead, iron, zinc and fecal coliform bacteria which pollute our waters.[1] The most common nonpoint pollutant is soil eroded from farms, construction sites, and stream banks. The soil destroys aquatic habitat by increasing turbidity, cutting off sunlight to aquatic plants and other organisms and smothering fish spawning areas. Runoff poisoned with fertilizer, pesticides, toxic metals and oils can have worse affects. Excessive nutrients in the water accelerates vegetation growth which can lead to oxygen depletion. The lower oxygen levels can cause fish kills. As the pace of coastal population growth and development continues to increase, there will be more impervious surfaces, septic systems, litter, chemicals and pesticides applied to lawns and gardens--all of which will increase the pollution of coastal waters.

The results of pollution from nonpoint sources are serious. Public and private drinking water supplies are threatened. Over 40 percent of the shellfish waters in the contiguous U.S. are closed from point and nonpoint source pollution. Since more than 70 percent of commercially important species of fish and shellfish spend some portion of their lifecycle in estuarine waters, pollution significantly affects the $3 billion a year commercial and recreational fishing industry. Also, beach closings resulting from debris washup not only cause lost recreational opportunities but lost revenue for local economies.

Why hasn't nonpoint source pollution been stopped?

The severity of the nonpoint source pollution problem only recently has been fully recognized. Nonpoint sources are harder to identify, and may initially appear less serious than discharges from industrial point sources. Public awareness is the most important component of efforts to stop the degradation of coastal waters. The farmer who lets cattle stand in a stream to cool off in the summer may not see how their waste could cause much harm. Neither does the homeowner who puts off fixing a faulty septic tank or who dumps used motor oil into a storm sewer. These seemingly small sources of pollution add up to significant adverse impacts when multiplied by the large number of people living adjacent to our coastal waters.

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[1] See U. S. Congress, Office of Technology Assessment, Wastes in Marine Environments, 1987 Chapter Three.

What are the sources of nonpoint pollution?

Storm water runoff, from rainfall and snowmelt, is the major source of nonpoint pollution. It consists of rainwater that is not absorbed into the land, combined with eroding soil, and litter, oil and heavy metals from roads. Unless properly managed, stormwater runoff increases as the land becomes urbanized. Unlike open land in fields or greenways, asphalt and concrete do not allow rain water to be absorbed into the land and filtered before it enters into waterbodies. Also, until people alter their activities in disposing of household chemical wastes, litter and domestic animal wastes, storm water runoff will be more severe as coastal areas continue to develop.

Boats and marinas are potential sources of untreated human and fish wastes, antifouling paints, boat cleaners, petroleum products, and runoff from parking lots.

Airborne sources, such as toxic chemicals transported by rain and wind, contribute significantly to coastal water pollution. In Long Island Sound, for example, it is estimated that 23 percent of the total nitrogen load is caused by atmospheric pollution. Airborne sources also account for a significant portion of the nitrogen load in the Chesapeake Bay.

Groundwater transport of pollutants into nearby water bodies can result from faulty septic systems and landfills located too close to the water. Rainwater can absorb pollutants as it flows through a landfill with an improper base and then pollute groundwater, which may flow into rivers and streams.

What is coastal management?

Congress enacted the Coastal Zone Management Act, P.L. 92-583 (CZMA), in 1972, to improve the nation's management of coastal resources, which were being irretrievably damaged or lost due to poorly planned development. Specific concerns included the loss of living marine resources and wildlife habitat, decreasing open space for public use, and shoreline erosion. Congress also recognized the need to resolve conflicts between various competing uses of coastal lands and waters.
Key elements of the CZMA are:

- The basic goal of the CZMA is to encourage coastal states to voluntarily develop comprehensive management programs. The CZMA establishes a partnership in which the states take the lead in managing their coastal resources, while the Federal government provides financial and technical assistance and agrees to act in a manner consistent with the federally-approved management programs. The law also establishes a National Estuarine Reserve Research System to designate and preserve specific estuarine sites.

- The CZMA was reauthorized in 1976, 1980 and 1986. It is subject to reauthorization in 1990.
- The Office of Ocean and Coastal Resource Management (OCRM), within the National Ocean Service of the National Oceanic and Atmospheric Administration (NOAA) administers the CZMA at the Federal level.

Who is responsible for coastal management?

- Of the 35 eligible states and territories, 29 participate in the Federal program. At the state level, a lead agency oversees implementation of the CZM program and administers the Federal grant funds. This agency may be solely responsible for all CZM planning, regulation, and management, or it may share implementation authority with other state agencies.
- Local governments are involved in the implementation of state CZM programs, either formally or informally. In some states, local governments play a central role by developing local coastal programs and by making land use decisions in accordance with state standards.
- Federal agencies are also involved in the development and implementation of state CZM programs. State and Federal agencies must coordinate during the development of state programs. Once NOAA approves a state coastal program, other Federal agencies must ensure that their actions are consistent with the state program. Through coastal management, states and Federal agencies cooperate in planning and permit processes, simplifying the regulatory process.

What can coastal management programs do about nonpoint source pollution?

State coastal management programs are in a unique position to help control nonpoint source pollution because they address land and water use issues within the coastal zone. Traditionally, addressing the shoreside causes of nonpoint pollution has been a state and local government responsibility through land use decisions. With state permits and support for local governments, coastal management programs can help focus attention on controlling nonpoint source pollution through stormwater regulations, land use planning, and zoning.

- States implementing their programs through state permits often require buffers to set development back from the shore, strict erosion and sedimentation control practices for construction projects, and stormwater control systems in new development, to cite a few examples.

- States implementing their coastal programs through local governments work with municipalities and counties to improve zoning and subdivision ordinances to control nonpoint source pollution, including reducing the density of development adjacent to shorelines .

Coastal management programs use several non-regulatory mechanisms to address nonpoint source pollution. They provide funds for research, public information and to encourage the voluntary use of best management practices, a term used to include a variety of nonpoint source pollution control techniques. The staff of coastal programs also provide public information and education on effective solutions to nonpoint source problems. Finally, coastal programs initiate purchases of property for wildlife habitat, research and recreation when that appears to be the only method to protect threatened coastal waters.

How are nonpoint source efforts being coordinated with other Federal agencies?

The Coastal Zone Management Act requires state coastal programs to incorporate the provisions of the Clean Water Act into their programs. Section 319(h) of the Clean Water Act requires states to submit to the Environmental Protection Agency (EPA) a Nonpoint Source Pollution Assessment Report and a State Management Program. Once the management program has been approved, the state is eligible for implementation grants. For the first time, funding will be available for the Section 319 program in Fiscal Year 1990; $40 million will be available for all fifty states to implement their nonpoint source programs. (The Fiscal Year 1990 appropriation for coastal management is $34 million for 29 states).

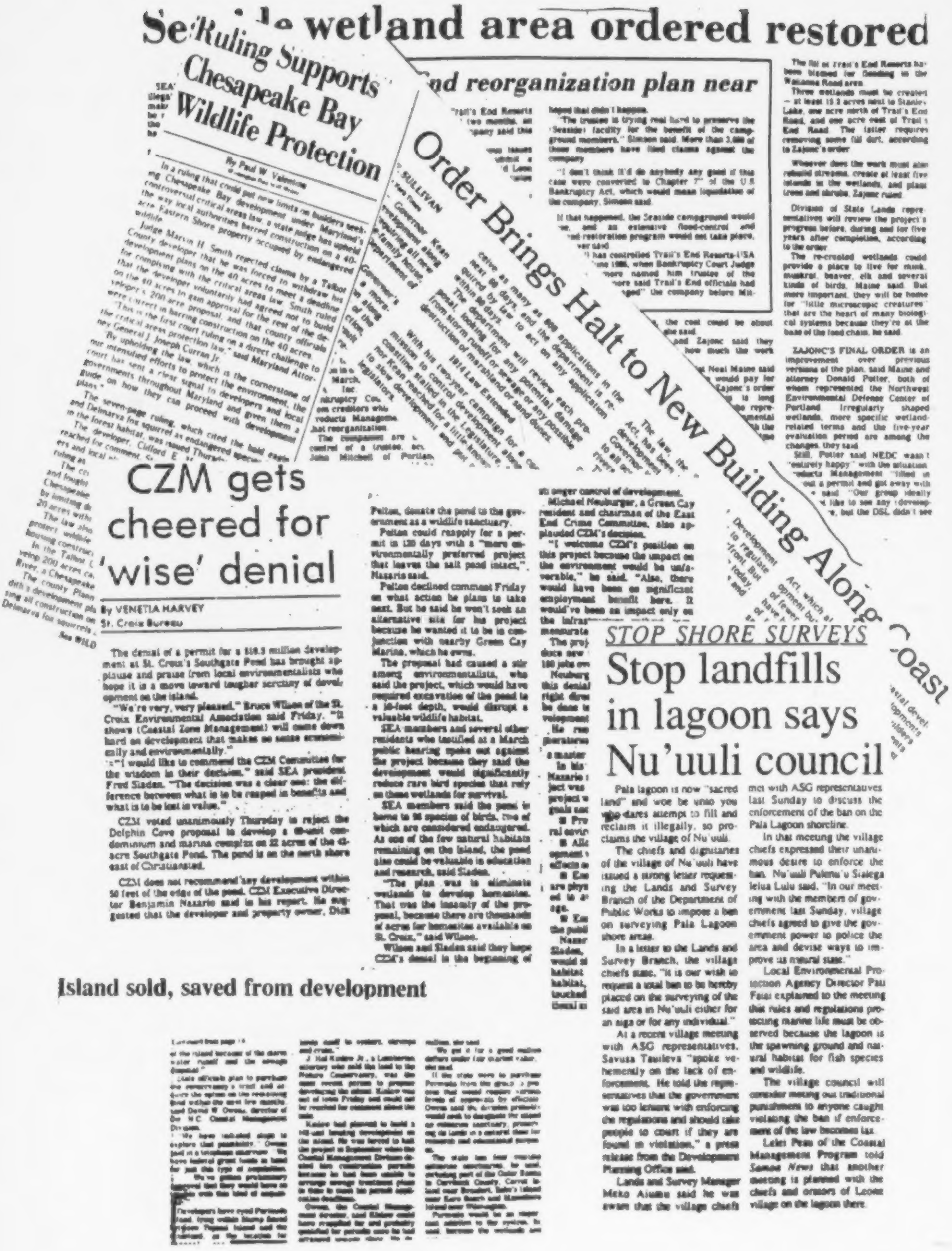
NOAA and EPA have coordinated their nonpoint source pollution efforts by sharing information with state contacts about each others' programs and encouraging the coastal agencies to participate in preparing Section 319 Assessment Reports and Management Programs. OCRM has reviewed the Section 319 management programs and encourages coastal management programs to give due consideration to the priorities established in these programs.

At the state level coordination has varied among states, often increasing in instances where the water quality agency and the coastal agency are in the same department. Even where this is not the case, as in New York, the coastal agency was a member of the task force that developed the Nonpoint Source Pollution Assessment and Management Program. In Florida and South Carolina, the Section 319 Assessments recognized the importance of the Federal Consistency provisions of the CZMA (see Part IV of this report) as a tool for implementing some of the nonpoint source reduction goals. Nevertheless, all participants recognize that there needs to be much better coordination. OCRM is working to assure that future revisions to Section 319 management plans incorporate state coastal programs efforts and assets, where appropriate.

In states participating in EPA's National Estuary Program, there are several opportunities to closely coordinate solutions to nonpoint source pollution. NOAA and EPA have signed a Memorandum of Understanding(MOU) toward this effort. In partial fulfillment of this MOU, NOAA and EPA held a regional conference in the Northeast to foster coordination and communication. NOAA continues to evaluate coordination through OCRM's formal state evaluation process.

OCRM has established a working relationship with the U. S. Department of Agriculture (USDA) to address agricultural contributions to nonpoint source pollution. The USDA will spend over $201 million on water quality issues in Fiscal Year 1991. Other parts of NOAA have contributed in the past to USDA research and database committee activities. OCRM and the Soil Conservation Service (SCS) have met to assure the programs compliment each other and do not duplicate efforts. OCRM has participated in various agricultural forums, such as the National Association of Conservation Districts 1990 conference to explain coastal management programs in nonpoint source control and has invited similar participation by the USDA in its activities.

State coastal program staff and SCS extension agents have worked in the field to assure coordinated programs, and have participated on each others advisory boards. In a few instances, CZM has provided partial funding to joint research efforts. Part II F of this report provides more specific examples.



wetland area ordered restored

Ruling Supports Chesapeake Bay Wildlife Protection

By Paul W. Valentine

In a ruling that could put new limits on builders seeking Chesapeake Bay development under Maryland's controversial critical areas law, a state judge has upheld the way local authorities barred construction on a 40-acre Eastern Shore property occupied by endangered wildlife.

nd reorganization plan near

hoped that didn't happen.

"The trustee is trying real hard to preserve the (Seaside) facility for the benefit of the campground members," Simson said. More than 3,000 of those members have filed claims against the company.

"I don't think it'd do anybody any good if this case were converted to Chapter 7" of the U.S. Bankruptcy Act, which would mean liquidation of the company, Simson said.

Order Brings Halt to New Building Along Coast

The fill at Trail's End Resorts has been blamed for flooding in the Walamna Road area.

Three wetlands must be created — at least 15.3 acres next to Stanley Lake, one acre north of Trail's End Road, and one acre east of Trail's End Road. The latter requires removing some fill dirt, according to Zajonc's order.

Whoever does the work must also rebuild streams, create at least five islands in the wetlands, and plant trees and shrubs, Zajonc ruled.

Division of State Lands representatives will review the project's progress before, during and for five years after completion, according to the order.

The re-created wetlands could provide a place to live for mink, muskrat, beaver, elk and several kinds of birds, Maine said. But more important, they will be home for "little microscopic creatures" that are the heart of many biological systems because they're at the base of the food chain, he said.

ZAJONC'S FINAL ORDER is an improvement over previous versions of the plan, said Maine and attorney Donald Potter, both of whom represented the Northwest Environmental Defense Center of Portland. Irregularly shaped wetlands, more specific wetland-related terms and the five-year evaluation period are among the changes, they said.

Still, Potter said NEDC wasn't "entirely happy" with the situation.

CZM gets cheered for 'wise' denial

By VENETIA HARVEY
St. Croix Bureau

The denial of a permit for a $18.5 million development at St. Croix's Southgate Pond has brought applause and praise from local environmentalists who hope it is a move toward tougher scrutiny of development on the island.

"We're very, very pleased," Bruce Wilson of the St. Croix Environmental Association said Friday. "It shows (Coastal Zone Management) will come down hard on development that makes no sense economically and environmentally."

"I would like to commend the CZM Committee for the wisdom in their decision," said SEA president Fred Sladen. "The decision was a clear one: the difference between what is to be reaped in benefits and what is to be lost in value."

CZM voted unanimously Thursday to reject the Dolphin Cove proposal to develop a 60-unit condominium and marina complex on 22 acres of the 42-acre Southgate Pond. The pond is on the north shore east of Christiansted.

CZM does not recommend any development within 50 feet of the edge of the pond, CZM Executive Director Benjamin Nazario said in his report. He suggested that the developer and property owner, Dick Pelton, donate the pond to the government as a wildlife sanctuary.

Pelton could reapply for a permit in 120 days with a "more environmentally preferred project that leaves the salt pond intact," Nazario said.

Pelton declined comment Friday on what action he plans to take next. But he said he won't seek an alternative site for his project because he wanted it to be in conjunction with nearby Green Cay Marina, which he owns.

The proposal had caused a stir among environmentalists, who said the project, which would have required excavation of the pond to a 10-foot depth, would disrupt a valuable wildlife habitat.

SEA members and several other residents who testified at a March public hearing spoke out against the project because they said the development would significantly reduce rare bird species that rely on these wetlands for survival.

SEA members said the pond is home to 96 species of birds, two of which are considered endangered. As one of the few natural habitats remaining on the island, the pond also could be valuable in education and research, said Sladen.

"The plan was to eliminate wetlands to develop homesites. That was the insanity of the proposal, because there are thousands of acres for homesites available on St. Croix," said Wilson.

Wilson and Sladen said they hope CZM's denial is the beginning of stronger control of development.

Michael Neuburger, a Green Cay resident and chairman of the East End Crime Committee, also applauded CZM's decision.

"I welcome CZM's position on this project because the impact on the environment would be unfavorable," he said. "Also, there would have been no significant employment benefit here. It would've been an impact only on the infras

STOP SHORE SURVEYS

Stop landfills in lagoon says Nu'uuli council

Pala lagoon is now "sacred land" and woe be unto you who dares attempt to fill and reclaim it illegally, so proclaims the village of Nu'uuli.

The chiefs and dignitaries of the village of Nu'uuli have issued a strong letter requesting the Lands and Survey Branch of the Department of Public Works to impose a ban on surveying Pala Lagoon shore areas.

In a letter to the Lands and Survey Branch, the village chiefs state, "It is our wish to request a total ban to be hereby placed on the surveying of the said area in Nu'uuli either for an aiga or for any individual."

At a recent village meeting with ASG representatives, Savusa Tauileva "spoke vehemently on the lack of enforcement. He told the representatives that the government was too lenient with enforcing the regulations and should take people to court if they are found in violation," a press release from the Development Planning Office said.

Lands and Survey Manager Meko Aiumu said he was aware that the village chiefs met with ASG representatives last Sunday to discuss the enforcement of the ban on the Pala Lagoon shoreline.

In that meeting the village chiefs expressed their unanimous desire to enforce the ban. Nu'uuli Pulenu'u Sialega Ielua Lulu said, "In our meeting with the members of government last Sunday, village chiefs agreed to give the government power to police the area and devise ways to improve its natural state."

Local Environmental Protection Agency Director Pati Faiai explained to the meeting that rules and regulations protecting marine life must be observed because the lagoon is the spawning ground and natural habitat for fish species and wildlife.

The village council will consider meting out traditional punishment to anyone caught violating the ban if enforcement of the law becomes lax.

Leiei Peau of the Coastal Management Program told *Samoa News* that another meeting is planned with the chiefs and orators of Leone village on the lagoon there.

Island sold, saved from development

II. A SURVEY OF COASTAL MANAGEMENT PROGRAMS SOLUTIONS TO NONPOINT SOURCE WATER POLLUTION PROBLEMS

A. MANAGING LAND USE: WATERSHED MANAGEMENT, BUFFERS AND SETBACKS

One of the most effective methods to protect water quality is to properly manage development immediately adjacent to waterbodies. Because state and local coastal programs can regulate the use of land, they can require buffers between development and the water. Vegetated, undeveloped land can absorb the nonpoint source pollution impact of development before it gets to the water. For example, a 100-foot buffer in native vegetation between a parking lot and a river can strain the oil and grease from cars before it reaches the water. A buffer can serve the same purpose in providing some protection from poorly functioning septic tanks.

Alaska CZM* uses buffers to protect rivers rich with salmon.

> Nearly 50 percent of the United State's entire sockeye salmon production comes from Bristol Bay, Alaska. The local coastal program wanted to assure protection of the coastal waters for salmon, which is an important commercial and subsistence resource.
>
> The Bristol Bay local coastal program establishes a 100-foot buffer for development which does not need to be adjacent to the water. The buffer thus protects the rivers for salmon migration, spawning and rearing and extends to the tributaries that affect those waters. Program policies place high priority on maintaining subsistence activities by natives and controlling the potential water quality impacts from placer mining.

The California Coastal Commission addresses nonpoint source pollution through its review of permits and local coastal programs.

> The California Coastal Act contains policies related to controlling runoff and requiring vegetated buffers, which enables the Commission to review individual permits to require grading plans and erosion control provisions.
>
> The Commission also reviews local coastal programs developed by cities and counties for consistency with the nonpoint source pollution policies.

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*Throughout this document CZM refers to the coastal management agency. Refer to Part V for specific agency names and addresses.

> For example, the Santa Barbara County Local Coastal Program establishes minimum buffers for wetlands and stream corridors. A minimum 100-foot buffer must be maintained in its natural condition along all wetlands. A minimum buffer for major streams in rural areas is 100 feet and 50 feet in urban areas. The local zoning code incorporates these requirements thus assuring their implementation.

The Rhode Island Coastal Program requires buffers for new development along non-bulkheaded waters.

> Under its permit program, the Coastal Resources Management Council reviews all development within 200 feet of the water. It requires a minimum 50 foot setback and requires additional buffers, kept in natural vegetation, of up to 200 feet adjacent to environmentally sensitive waters. In addition, for large residential and commercial projects, other requirements may be imposed such as: 1) conservation easements on buffers, complete with boundary markers; 2) commercial lawn care restrictions built into the condominium articles or individual lot deeds; 3) access and buffer management plans; 4) restrictive covenants on future activities; 5) education programs put together by the developer regarding the site's sensitive areas; and 6) where sewage treatment plant upgrades are a concern, new developments are phased in with the plant upgrades.

New York local governments use CZM funds to address nonpoint source pollution problems.

> The Town of East Hampton coastal program has a seven point program to address nonpoint source pollution: (1) setbacks from waters for structures and septic systems and low density zoning; (2) land acquisition and conservation easement programs; (3) redesign of street ends to minimize runoff; (4) fertilizer application and land clearing restrictions; (5) a permit system which requires special review of projects near designated natural features; (6) surface water quality monitoring and testing and (7) improved local law enforcement. All of these practices are incorporated into local zoning and are included in the Local Waterfront Revitalization Program which is binding on State agency actions.

North Carolina requires permits for development projects impacting critical areas.

> CZM reviews development in the 575 foot Area of Environmental Concern adjacent to nine waterbodies designated as Outstanding Resource Waters. CZM also reviews all development within 75 feet of tidal wetlands. New development projects cannot add nonpoint source impacts on the critical areas.

Maryland encourages planting buffer zones.

> CZM funds have been used to plant trees, shrubs and native ground cover in several areas along the Chesapeake Bay and its tributaries. The state's "Greenshores Program" promotes the planting of forested buffers along the shoreline of the bay. This activity is especially important because these buffers minimize nonpoint pollution, as well as provide wildlife habitat.

In **American Samoa**, a local village council regulates land use to protect a lagoon.

> CZM has supported a significant public education effort which combines the protection of wetlands and other natural resources with the preservation of Samoan culture. Meetings in Nu'uuli Village resulted in support from the local village council for continued regulatory and enforcement efforts to protect Pala lagoon from nonpoint pollution sources. This was a significant resource management landmark in working within the traditional land tenure system in American Samoa.
>
> A mangrove forest adjacent to the Nu'uuli lagoon was threatened by nonpoint pollution and encroachment by filling. Recognizing the significance of the lagoon, the Coastal Program commissioned a resource management study. As a result, the American Samoa Government obtained EPA funds to construct a sewer line around the lagoon to significantly reduce water quality threats from 400 nearby homes.

In **Massachusetts**, coastal Areas of Critical Environmental Concern (ACEC) along rivers and estuaries are protected.

> After an area is designated an ACEC, proposed development projects within it are subject to more intense scrutiny under the Commonwealth's regulatory programs and the Massachusetts Environmental Protection Act. For example, every application for a dock or pier located in an ACEC is reviewed for nonpoint pollution impacts. There are currently 12 ACECs designated, which protect over 145 miles of shoreline.

New Hampshire assists local governments to incorporate water quality issues in land use decisions.

> CZM funds were used to prepare the estuarine portion of the water resource plan for the towns of Newfield and Stratham. A comprehensive resource inventory and maps of resources along the river corridor will be

prepared. This information will be used by both towns in making decisions on zoning, subdivision controls, and setbacks.

Maine requires a 75-foot setback for construction along, marine and fresh waters so as to maintain vegetated buffers and reduce non-point source contributions.

The CZM program, through the State Shoreland Zoning Law, requires coastal communities to zone all lands within 250 feet of any waterbody. Within this zone it establishes a 75 foot setback along marine waters (100 feet along fresh water). In 1990, the law was amended to strictly limit the amount of clearing that can occur so as to maintain a vegetated buffer. No development, other than waterdependent uses, can occur within 75 feet of the water, including construction of roads and parking lots. Furthermore, in 1990, the CZM program adopted numerical standards to control sediment and phosphorous contributions to waterbodies.

B. CONTROLLING URBAN AND SUBURBAN RUNOFF

Control of stormwater runoff can significantly control pollutants. Stormwater can contain soil from eroding cliffs and construction sites, as well as lawn chemicals, street litter, oil and grease. State coastal programs issuing permits or having other land use authorities often require stormwater prevention techniques for new developments to assure that stormwater is controlled.

Urban runoff, containing street litter, pet waste, road salt, sand and oil, can be carried by water and winds into adjacent rivers. State coastal programs are beginning to get involved with towns to emphasize the importance of regular street sweeping, catchment basins, and other activities.

North Carolina requires new developments to control stormwater and encourages local coastal plans to include stormwater regulations.

> CZM initiated the development of stormwater runoff regulations which now apply to all new development projects adjacent to estuarine waters.
>
> CZM has encouraged local land use plans prepared in coastal counties to include stormwater runoff plans. Nine plans are currently being completed.

New York local coastal plans require no increase in stormwater runoff and redesign streets to control runoff.

> The local waterfront plan of the Village of Mamaroneck instituted stormwater runoff retention regulations which require that peak rates of discharge are not increased beyond pre-development or pre-construction levels for all new development. This "zero increase" policy is now a model for other local waterfront plans.
>
> The Village of Patchoque used CZM funds to redesign street ends to reduce stormwater flowing directly into the bays and rivers. Included in the redesign were sediment basins and buffers of native planting.

In Wisconsin, a Priority Watershed Program protects the Milwaukee River.

> The coastal program funded a study to control nonpoint source pollution in the Milwaukee River. A model ordinances for construction site erosion control and a development handbook were prepared. Model ordinances for other urban problems are being developed on stormwater, water retention, pet waste and sweeping streets. In agricultural areas, CZM is working with landowners to develop conservation plans.

South Carolina Coastal Council reviews stormwater management plans for new permits.

> The Coastal Council adopted stormwater guidelines in 1988, which generally require retention of the first inch of rain and requires the release of runoff in excess of one inch to be at a rate no greater than if was undeveloped based on a five-year, 24 hour storm event.

Rhode Island requires CZM applicants to submit professionally designed sedimentation and erosion control plans and stormwater management plans. They also manage all the poorly flushed estuaries in the state on a watershed basis.

> All developments subject to CZM jurisdiction (a minimum of 200 feet from the coastal water) are required to have on-site treatment of a one year storm event and are required to keep runoff at pre-development levels. Discharging of run-off directly into the estuaries is prohibited. Run-off from parking lots and roads must be treated to remove oil and sediments, and all driveway and parking areas must be of a pervious material.
>
> To protect poorly flushed estuaries, the CZM develops Special Area Management Plans which form interagency agreements at the State and local levels. These agreements are the basis for action plans which outline how various nonpoint source pollution problems are to be regulated and corrected. Thresholds for development which trigger CZM jurisdiction within these areas are subdivisions of six units or more and commercial developments which require one acre or more of impervious surfaces.
>
> CZM works with towns and the State Department of Transportation to identify trouble areas in the road drainage systems for retrofit and upgrades.

C. IMPROVING SEWAGE DISPOSAL SYSTEMS

Poorly located or faulty septic systems are a major source of pollutants in some rural and suburban waters. As a result shellfish bed closures are often necessitated. Coastal programs have been involved in assisting local governments and homeowners in correcting these problems, and in evaluating and monitoring alternative systems.

New York funds promotion of alternative systems.

CZM funded Save the River, a non-profit group operating along the St. Lawrence River, to assist riverfront property owners in correcting faulty individual sewage disposal systems that have polluted the river for years.

Based on the premise that if people knew they were polluting they would take steps to correct problems if they were shown how, homeowners are provided with free, on-site surveys on the effectiveness of their system. Trained volunteers conduct the surveys using tracer dyes and offer information about alternative systems such as aerobic tanks, low flush, composting and incinerating toilets.

Once a homeowner successfully passes the survey, Save the River awards them a hand-crafted Save the River Clean Water Award. Over 120 surveys were conducted in the summer of 1989; there is currently a waiting list of 45.

Rhode Island assists owners to properly maintain or improve septic tanks.

CZM awarded grants to the towns of Charleston and South Kingstown to evaluate septic systems that were suspected of having failed near the ecologically fragile salt ponds. A CZM funded brochure about the "care and feeding" of septic systems was mailed with tax bills to property owners. As a result of this effort, South Kingstown established a tax rebate as an incentive for annual pump-outs.

CZM funds were also used to provide information to owners about low interest loans and a State grant program to make desired improvements. The towns were influential in obtaining State legislation which enabled special management districts to be created for non-sewered areas. Four districts are now operating which have an inspection system requiring mandatory pumping every three years and the authority to make corrections.

CZM permits require upgrading of an inadequate system as a condition for all rehabilitation or enlargement permits of over 150 square feet.

D. CONTROLLING MARINA IMPACTS

Wastes from boats can severely degrade shallow estuarine waters. The long-recognized solution for controlling boat wastes has been to require boats to have holding tanks and marinas to have facilities for pumping them out. While there has been some resistance to these approaches in the boating community, CZM programs have often pressed for requirements for pump-out facilities in new marinas. Marinas also cause adverse impacts on waters through their normal operations - i.e., pumping gas, scraping and painting hulls, and engine repairs. CZM permits have been used to control some of these impacts.

Poorly sited marinas can destroy habitat and degrade water quality when located in basins with low flushing rates. Marinas can alter circulation patterns and destroy wetlands during construction and maintenance dredging. CZM programs have played an active role in the siting of new marinas, using regulatory permits to direct marinas away from pristine or valuable shellfish areas. Dredging for marinas is also closely reviewed by coastal programs. Another criterion for siting has been assuring that flushing rates and circulation patterns in proposed project areas are adequate to minimize adverse impacts on water quality and habitat protection.

Connecticut CZM requires pump-out facilities for new marinas and proposes "No Discharge Zones."

> The State requires pump-out and other marina sanitation facilities as a condition of approval for all permits for new marinas and significant marina expansions. CZM has proposed legislation which would establish "no discharge zones," requiring marinas and other dock facilities to provide pump-out facilities, and allowing inspection of vessels and docking facilities for compliance with the new regulations.

New Jersey CZM requires pump-out facilities for new marinas and controls siting of marinas in critical areas.

> The CZM permit requires pump-out facilities for new or expanding marinas. The permit may require dockside restrooms. CZM has proposed legislation to recover some of the fuel tax from recreational boaters to subsidize pump-out facilities at existing marinas.
>
> CZM has been actively involved in improving water quality along the St. Georges watercourse in Brigantine, Atlantic County. In addition to initiating a Special Area Management Plan to address many coastal issues, CZM has been denying permit applications for the construction of marinas, docks and piers because of the presence of valuable, harvestable shellfish resources. As a result, there has been a continuing improvement of water quality.

CZM has completed a shellfish mapping project which identifies areas of high density shellfish resources. These maps are used by permit review staff in decisions on siting marina development in the coastal zone.

Delaware CZM has supported marina retrofitting legislation.

The CZM agency will promulgate final regulations on marina siting and operations in March 1990. The regulations will include requirements that existing marinas develop operations and maintenance plans. These plans must address the 1988 marina pump-out law, which requires existing and new marinas to provide pump-out facilities for all vessels, and direct slipside pump-outs for liveaboards.

The South Carolina Coastal Council minimizes marina impacts on wetlands and marine resources.

The Council not only regulates siting of marinas but also their operations. See Part III D of this report for details.

E. SITING LANDFILLS AND REDUCING PLASTICS AND LITTER

Solid waste landfills often have been placed adjacent to rivers with little thought given to their impact on the adjacent waters. Landfills can leach toxics and nutrients into the groundwater and from there into adjacent rivers. Direct contamination can occur during floods.

Litter often is washed directly into waterways with stormwater or through combined sewer outfalls. Coastal programs have been involved in several efforts to control solid waste, including leading a massive, nationwide beach cleanup effort every fall. (See Coastal Management: Solutions to Our Nation's Coastal Problems, December 1988 for details.)*

Some **Alaska** local programs prohibit hazardous waste in landfills.

> The Juneau local coastal plan prohibits hazardous landfill materials within 100 feet of a floodplain, in order to protect the waters from any leaching from the landfill.
>
> In addition, no new development which will involve the storage of hazardous materials will be permitted in the 100 year floodplain unless there is no feasible and prudent alternative and unless safety measures are provided to prevent accidental discharges.

Alabama requires solid waste sites to control impact on coastal waters.

> CZM funds have been used recently to conduct a solid waste monitoring study of unpermitted solid waste sites in the coastal zone. Sites were inventoried using aerial reconnaissance and field inspections. Property ownership was determined. After notification, the State negotiated with owners to clean up the sites and has initiated several administrative and enforcement procedures against owners still not complying.

New Jersey encourages street sweeping and improves solid waste handling.

> As part of its coastal development permit, CZM has required regular street sweeping when litter is likely to be a major pollutant. CZM and the U.S. EPA worked together to examine sources, types, and movement of marine debris along the New Jersey coast. A major debris wash-up in August 1987 of medical waste, wood, and glass was investigated. It was found that the

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* Copies available from OCRM, see address in Preface.

solid waste handling, transfer, and disposal procedures of New York City were the major source of floating debris. The City and New Jersey have since reached agreement to reduce inadvertent releases of trash as it is moved by barges.

Mississippi CZM enforces strong pollution legislation.

The CZM initiated legislation which made the State the first to adopt the marine pollution provisions of Annex V of the Protocol of 1978 of the International Convention of Pollution. CZM now monitors and enforces this State law and promotes increased public awareness through information programs.

The legislation prohibits the discharge of any litter from land, any size marine vessel, oil rigs, or the air. It regulates the discharge of all types of plastics, garbage, food and human wastes. Boaters will also be held liable for accidental spills, dumping or disposal of materials into State waters.

California Coastal Commission encourages recycling as part of its Adopt-A-Beach program.

A specific goal of the Commission's Adopt-A-Beach program, a year-round coastal clean-up program, is to increase the number of beaches where recycling occurs. Currently, all beaches operated by Los Angeles County have recycling programs for beach debris.

F. MANAGING FARM PRACTICES

Farming practices can be a significant source of nonpoint pollution. Fertilizers, chemicals for weed control, soil tilling in a manner that causes runoff into the waters, and animal waste can all cause pollution. Minor changes to farming operations by farmers can limit these impacts. Coastal programs have worked with local soil conservation officials and rural governments to assist farmers to use best farm management practices on a voluntary basis and occasionally have used the regulatory process to require such practices.

Delaware funds a unique solution to the animal disposal problem.

> Numerous large poultry growers operate in Delaware; manure and bird carcasses create a significant nonpoint source pollution problem. Local conservation districts, which operate with CZM funds, have developed a dead bird composting program in cooperation with extension services and state universities. Farmers first add a mixture of manure and water to bird carcasses. The compost pile then "cooks" the carcasses through natural processes until only compost remains. The process is virtually odor-free and produces a quality compost. Although the program is only in the pilot stage, the results are encouraging.

Maryland requires conservation plans and best management practices on agricultural lands.

> The Maryland Critical Area Program requires soil conservation and water quality plans to be developed for agricultural lands and best management practices implemented to minimize runoff from agricultural lands. See III A for details about the Critical Area Program.

The Maine CZM program adopted revisions in 1990 to the Shoreland Zoning Law which require more stringent municipal management of agricultural activities along marine waters.

> New agricultural activities (e.g., tilling, grazing, and manure storage) along marine waters must be performed consistent with requirements applied to construction activities (e.g.., buildings, parking lots, etc.). Furthermore, existing manure storage facilities within 75 feet of the shore must be removed or reconstructed to meet a "no discharge" standard by 1995.

In **Washington** CZM conducted a study which found farming practices contributed to pollution and developed procedures for improvements.

> Better pasture management, including fencing along the creeks, were initiated as a result of a CZM study. The success of this small study led to a larger effort by the State to develop a Basin Water Quality Plan which was partially funded by CZM. See Part III C of this report for more details.

G. MONITORING NONPOINT SOURCE POLLUTION

The specific relationships between development and nonpoint source pollution are not completely understood nor are the solutions. State CZM programs have initiated unique research and monitoring activities to increase their understanding of these relationships.

Rhode Island CZM monitors septic systems and establishes "Pond Watchers".

CZM, working with the University of Rhode Island(URI), and URI Sea Grant, funded research to monitor and field check an innovative denitrification septic system which CZM had required homeowners to use in an extremely sensitive cove. The ongoing study has found that standard septic systems remove much less nitrogen than scientists previously believed.

The "Pond Watchers Program" has been established with citizens monitoring water quality turbidity and other physical and chemical parameters. Their information is forwarded to CZM for analysis and action. This program has been so successful that the State has expanded it to certain rivers.

New Hampshire CZM monitors the Great Bay.

CZM has identified nonpoint source pollution as a potential problem in the Great Bay area and is funding a project through the Jackson Estuarine Laboratory to study the significance of high volume runoff storm events on bacterial and nutrient loading.

The study results will be used to develop improved criteria for municipal water resources plans which are now required by the Water Protection Assistance Program Act. These plans are a prerequisite for either adopting or amending local zoning ordinances.

In Washington, coastal funds are used to investigate freshwater wetlands for nonpoint pollution control.

Kings County used CZM funds in a multiphased research program to investigate the viability of using freshwater wetlands for urban surface water management and nonpoint source pollution control. The project involves collecting baseline data, sampling, analyzing, and monitoring the wetlands and interpreting the results to devise policy and management guidelines that protect wetlands and downstream waterbodies.

In 1989, CZM funded the design of a monitoring program to diagnose sources of bacterial contamination of shellfish beds. Since its completion, a number of water resource managers have used the monitoring program in other localities.

South Carolina CZM funded instream monitoring.

CZM funded Section 208 Clean Water Act updates for communities located in the coastal zone. As part of the update for the Charleston area, CZM funded instream monitoring for water pollutants and sources in the Ashley and Waccamaw Rivers.

Northern Mariana Islands provided staff and funds for water quality monitoring activities.

CZM has provided staff and funding to support the Commonwealth's water quality monitoring program, within the Division of Environmental Quality. In addition, special studies have been conducted such as the Suspended Sediment Load Study for Saipan Lagoon and Lau Lau Bay, which was completed in August 1989.

New York CZM scientifically studies two stream corridors.

CZM, with the Long Island Regional Planning Board, is developing recommendations for maintaining and improving fresh and marine water quality in stream/river corridors feeding into the Great South Bay. The study will be conducted using one semi-rural and one urban stream corridor. The purpose of the study is to identify linkages between land and water uses and activities and impaired water quality and, based on those linkages, recommend the most effective action needed to cope with stream corridor pollution.

In Florida, over $30 million in State funds in 1987 and 1988 were directed to water basin monitoring and planning.

CZM developed the administrative procedures to guide the program and administers the trust fund grants to water management districts. CZM also manages the State review of completed basin plans. See Part III B of this report for more details.

Using CZMA funds, CZM developed guidelines for interpreting metal concentrations in coastal sediments. The guidelines have been used to identify the extent of nonpoint source pollutant metals in several estuaries.

H. INCREASING INFORMATION ABOUT NONPOINT SOURCE POLLUTION

Because nonpoint source pollution is difficult to control and some of its reduction requires citizens to alter their actions, there is a large role for public education. Coastal programs have been actively involved in information exchange on a broad spectrum of problems by providing newsletters and other publications which have proven useful in increasing public understanding. In addition, coastal programs have worked with special interest groups, such as developers, who have specific technical information needs which can be met through publications and training sessions.

Northern Mariana Islands sponsors Stormwater Control Handbook.

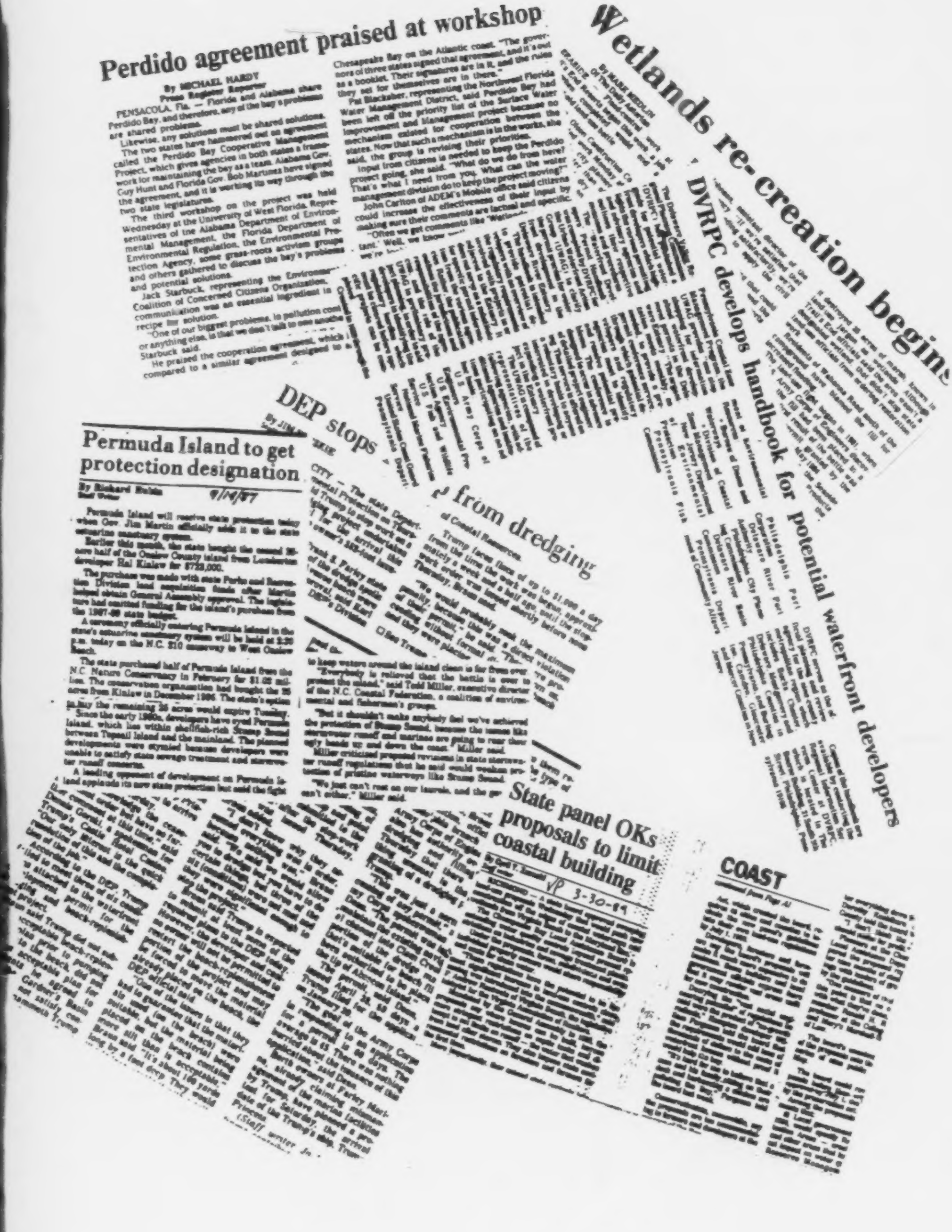
> CZM contracted with the SCS to prepare a handbook to assist developers and farmers in minimizing erosion and sedimentation of marine waters. The handbook includes soil and rainfall information specific to the inhabited islands of Saipan, Tinian, and Rota, as well as technical guidance for controlling runoff during construction and farming operations.
>
> Other state CZM programs which have prepared similar handbooks are **New Jersey**, **South Carolina**, **Virginia**, **Rhode Island** and **Maryland**.

New York cosponsored three workshops on nonpoint source pollution.

> In 1989, the coastal program cosponsored three workshops focusing on the Peconic Bays to address: 1) boater pollution 2) septic systems and 3) nonpoint source pollution. Experts from other states were brought in to describe their experiences, and over 150 people attended. Written summaries of the results of the workshops are available.

Rhode Island distributes an information letter to all permittees on care and maintenance of buffer areas.

> The letter describes the property owner's responsibilities and potential legal repercussions for violations.



Perdido agreement praised at workshop

By MICHAEL HARDY
Press Register Reporter

PENSACOLA, Fla. — Florida and Alabama share Perdido Bay, and therefore, any of the bay's problems are shared problems.

Likewise, any solutions must be shared solutions.

The two states have hammered out an agreement called the Perdido Bay Cooperative Management Project, which gives agencies in both states a framework for maintaining the bay as a team. Alabama Gov. Guy Hunt and Florida Gov. Bob Martinez have signed the agreement, and it is working its way through the two state legislatures.

The third workshop on the project was held Wednesday at the University of West Florida. Representatives of the Alabama Department of Environmental Management, the Florida Department of Environmental Regulation, the Environmental Protection Agency, some grass-roots activism groups and others gathered to discuss the bay's problems and potential solutions.

Jack Starbuck, representing the Environmental Coalition of Concerned Citizens Organization, said communication was an essential ingredient in the recipe for solution.

"One of our biggest problems, in pollution control or anything else, is that we don't talk to one another," Starbuck said.

He praised the cooperation agreement, which he compared to a similar agreement designed to aid the Chesapeake Bay on the Atlantic coast. "The governors of three states signed that agreement, and it's out as a booklet. Their signatures are in it, and the rules they set for themselves are in there."

Pat Blacksher, representing the Northwest Florida Water Management District, said Perdido Bay had been left off the priority list of the Surface Water Improvement and Management project because no mechanism existed for cooperation between the states. Now that such a mechanism is in the works, she said, the group is revising their priorities.

Input from citizens is needed to keep the Perdido project going, she said. "What do we do from here? That's what I need from you. What can the water management division do to keep the project moving?"

John Carlton of ADEM's Mobile office said citizens could increase the effectiveness of their input by making sure their comments are factual and specific.

"Often we get comments like 'Wetlands ... tant.' Well, we know ... we're ...

Wetlands re-creation begins

DVRPC develops handbook for potential waterfront developers

DEP stops ... from dredging

Trump faces fines of up to $1,000 a day from the time the work was begun, approximately a week and a half ago, until the stop-work order was issued shortly before noon Thursday, Brown said.

Permuda Island to get protection designation

By Richard Rubin
Staff Writer 9/14/87

Permuda Island will receive state protection today when Gov. Jim Martin officially adds it to the state estuarine sanctuary system.

Earlier this month, the state bought the second 25-acre half of the Onslow County island from Lumberton developer Hal Kinlaw for $725,000.

The purchase was made with state Parks and Recreation Division land acquisition funds after Martin helped obtain General Assembly approval. The legislature had omitted funding for the island's purchase from the 1987-88 state budget.

A ceremony officially entering Permuda Island in the state's estuarine sanctuary system will be held at 2:30 p.m. today on the N.C. 210 causeway to West Onslow Beach.

The state purchased half of Permuda Island from the N.C. Nature Conservancy in February for $1.02 million. The conservation organization had bought the 25 acres from Kinlaw in December 1986. The state's option to buy the remaining 25 acres would expire Tuesday.

Since the early 1980s, developers have eyed Permuda Island, which lies within shellfish-rich Stump Sound between Topsail Island and the mainland. The planned developments were stymied because developers were unable to satisfy state sewage treatment and stormwater runoff concerns.

A leading opponent of development on Permuda Island applauds its new state protection but said the fight to keep waters around the island clean is far from over.

"Everybody is relieved that the battle is over to protect the island," said Todd Miller, executive director of the N.C. Coastal Federation, a coalition of environmental and fishermen's groups.

"But it shouldn't make anybody feel we've achieved the protection of Stump Sound, because the issues like stormwater runoff and marinas are going to rear their ugly heads up and down the coast," Miller said.

Miller criticized proposed revisions in state stormwater runoff regulations that he said would weaken protection of pristine waterways like Stump Sound.

"We just can't rest on our laurels, and the ... can't either," Miller said.

State panel OKs proposals to limit coastal building

VP 3-30-89

COAST

III.DETAILED EXAMPLES OF COASTAL MANAGEMENT AND NONPOINT SOURCE POLLUTION

A. CRITICAL AREA PROGRAM IN MARYLAND

Overview and problem

In passing the Chesapeake Bay Critical Area Protection Act (Critical Area Act) in 1984, the Maryland General Assembly recognized that the cumulative effects of human activity have resulted in deteriorating water quality and productivity of the Bay and its tributaries. The primary purpose of the Critical Area Law is to foster more environmentally sensitive development within Chesapeake Bay's critical areas thereby minimizing damage to water quality and natural habitats.

The bay has experienced three centuries of human use and neglect. Rapidly increasing population and development pressures, and agricultural and urban runoff have caused an increase in bay nutrients which deplete the oxygen supply for fish and aquatic life. Uncontrolled agricultural practices and urban development have increased sedimentation of the Bay, blocking the light needed for submerged aquatic vegetation and filling navigational channels. Finally, toxic laden runoff and dredge material disposal have adversely affected the diversity and health of bay species.

The Chesapeake Bay

The Chesapeake Bay is the nation's largest estuary and one of its most valuable natural resources. Located within Maryland and Virginia, its mainstream is over 195 miles long and 3.4 to 35 miles wide. The bay drains 64,000 square miles with over 150 rivers, creeks and streams flowing through portions of six states and the District of Columbia.

The bay provides an abundant fishery and wildlife habitat of national importance. Its extensive finfish and shellfish harvest represents an annual commercial value of approximately one billion dollars. In addition to the riches from its waters, the extensive 7,000 miles of shoreline and over 200,000 acres of wetlands support more than 2,700 species of animals and plants, and are a major stopover for migratory birds along the Atlantic flyway.

Development and administration of the Chesapeake Bay Critical Area Program

In 1983, the Governor of Maryland appointed a task force to address the declining health of the Chesapeake Bay. The task force proposed that the State enact a Critical Area Act. During initial discussions, the Maryland Coastal Zone Management Program's (MCZMP) Coastal Resources Advisory Committee

(CRAC) played an important role in the development of the Critical Area Act. The CRAC, with over 100 members from local governments, state agencies, Federal agencies, and private interests, is supported by CZM funds, and advises the Maryland Department of Natural Resources (DNR) on coastal issues.

In June 1984, the Critical Area Act was enacted and the new Critical Area Commission (Commission) began developing the criteria to guide local government development and implementation of local Critical Area Plans. The 26 member Commission is composed of local officials and broadbased interest group members from each coastal county, as well as state officials. After much public input, the Commission promulgated criteria in December 1985, which were then signed into law in May 1986. Local plan development then started and by January 1990, 55 of the 60 local plans were completed and are being implemented. The five remaining plans are nearing completion. Since 1983, approximately $1.4 million in federal CZM funds have been used by the MCZMP, the Commission, and CRAC in the development and implementation of the Critical Area Law. State funds for the Critical Area Program have totaled more than $10.4 million.

The Critical Area Program includes all Chesapeake Bay tidal waters and tidally submerged lands, the 100-year tidal floodplain and extends 1,000 feet beyond the landward boundaries of state or private wetlands. Local governments may expand the boundaries of their critical area, but they cannot reduce it below the 1,000 foot minimum area. Within the 1,000 foot management boundary, local jurisdictions are required to incorporate the Commission's criteria into their plans and permit process. The criteria contain policies addressing habitat protection, water dependent facilities, agriculture, surface mining, and development.

The primary responsibility for implementing the Critical Area Act lies with the local governments which are required to develop management programs to carry out three protective goals: (1) minimize adverse impacts on water quality; (2) conserve fish, plant and wildlife habitat; and (3) establish land use policies for development in the Critical Area.

Criteria for controlling nonpoint pollution through the Critical Area Program

To minimize the impact of growth on water quality, the Commission designated three land use categories: Resource Conservation Areas, Limited Development Areas, and Intensely Developed Areas.

- Resource Conservation Areas (RCAs) generally have less than one dwelling unit per five acres, no public water or sewer, and are mostly composed of wetlands, forest, and uncultivated and cultivated fields. Development in RCAs is limited to an overall density of one residential dwelling unit per 20 acres. Local governments are directed to conserve, protect, and enhance ecological values, biological productivity, and species diversity in the critical area. Development activities in the RCA must also comply with the Limited Development Area criteria.

- Limited Development Areas (LDAs) are characterized by one dwelling unit per five acres up to four units per acre. The LDAs have water and/or sewer, and land use is mixed but not dominated by agriculture, wetlands, forest or open space. Nonpoint source pollution controls for LDAs include restricting the removal of forested land to 20% for any one development project, limiting impervious areas to 15% of a site, encouraging clustering of dwelling units, criteria restricting stream alteration, and requirements for replacing cleared forest land elsewhere in the critical area on a one-to-one basis.

- Intensely Developed Areas (IDAs) are characterized by dense residential or commercial uses. IDAs have four or more dwelling units per acre and/or have public sewer and water serving three or more units per acre. Reducing nonpoint source pollution in IDAs is accomplished by reducing pollutant loadings by 10% from pre-development loads for redevelopment projects, protecting remaining wooded areas and enhancing vegetation for new developments, and requiring local government water quality assessments and programs that improve water quality and protect remaining natural habitats.

Up to five percent of a county's RCA may be redesignated as IDAs or LDAs, excluding the RCA acreage in tidal wetlands or federally owned property. No more than one-half of this expansion may occur in the RCA.

Specific nonpoint source pollution control policies which apply to the entire Critical Area include: establishing a minimum 100-foot buffer landward from the mean high water line of tidal waters, streams, and wetlands; a minimum 25-foot buffer around non-tidal wetlands; limiting timber harvesting 50 feet from the Bay and perennial tributary streams; developing agricultural soil conservation plans and best management practices; and maintaining a 25-foot filter strip along tidal waters until a soil conservation plan is implemented.

Evaluation and future efforts

Local Critical Area Plans are now being implemented. The success of the program depends on adequate enforcement at both the state and local levels. In addition, sufficient funds will be needed by the Commission and the local governments to fulfill their responsibilities. While the Commission is already seeing an increase in forested areas due to the criteria and better development designs, there is growing concern that the program which promises to do much for the health of the Chesapeake Bay may be inadequate by itself. Many believe that increased growth along the entire bay watershed, may, in the long run, overwhelm efforts to improve water quality unless stricter controls and stronger growth management policies are applied. In response to this concern, the Governor of Maryland appointed the 2020 Chesapeake Bay Growth Management Commission to examine this problem. Recommendations from the Commission are expected in the fall of 1990.

B. BASINWIDE WATER QUALITY IN FLORIDA

Overview and problem

The State of Florida is growing at a tremendous pace. Despite the economic benefits of development, rapid growth exerts pressures on the natural systems including wetlands and water quality. Urban development within the state and increased agriculture has increased stormwater and waste water loading in many watersheds in the State. Florida responded to these pressures by setting up a variety of statewide, regional and local initiatives to address water quality issues. Two of these important programs are described below:

Development and administration: SWIM program

The Surface Water Improvement and Management Act (SWIM) was signed into law by Governor Martinez on June 29, 1987. This landmark legislation set up a program and provided initial funding to begin the cleanup and restoration of polluted surface water in Florida, along with the preservation of threatened waterbodies within the State. The State's five water management districts are responsible for implementing the law.

Each water management district is required to address priority waterbodies named by the legislature within its area and prepare a priority list of other waterbodies in need of restoration, conservation and/or preservation.

Funds are provided through a trust fund administered by the state Department of Environmental Regulation (DER). The Coastal Management Program, within the DER, is responsible for reviewing and recommending actions pertaining to SWIM waterbody plans, projects, and funds. The Coastal Zone Management grants have provided significant influence over the direction taken by the water management districts' SWIM activities.

Criteria to control nonpoint source pollution: SWIM program

After they identify priority watersheds, each water management district develops a plan to address the identified water quality problem for each watershed. Besides biological and physical descriptions of the waterbody, the plans contain land use and nonpoint source assessments which will help determine overall impacts of land use within the basin and lead to revised best management practices. The plans identify legal frameworks, needed coordination efforts between state and local entities, and public information programs required for the success of the overall effort. The plans include a timetable for bringing all sources into compliance with state water quality standards and a strategy to restore those water bodies in need of restoration. Finally, the plans will describe projected cost and revenue capability in order to reach each intended water- body goals.

Evaluation and future efforts: SWIM program

The Coastal Zone Section within DER's Bureau of Surface Water Management has played a pivotal role in overseeing the SWIM program. Coastal zone staff produced the administrative procedures used to guide the statewide program and administer the SWIM trust fund grants to the water management districts. The coastal zone staff also directly manages the State's review of proposed SWIM plans including coordination of DER and other State agency comments. These efforts have been essential to the success of the program to date.

As of August 1989, the DER had approved SWIM plans for 18 waterbodies, including, among others, Tampa and Biscayne Bays, Apalachicola River and Bay, and the Suwannee River. Plans for such critical areas as the Everglades Natural Park/Florida Bay, Indian River Lagoon and the lower St. Johns River were either conditionally approved or are under development.

Development and administration: Estuarine Initiative

For several years, CZM funds have been a catalyst for interagency investigations to assess the overall health of the several major estuarine areas, to identify priority management problems, and to provide direction and leadership for coordinated intergovernmental management. Major improvements have been made in Florida's ability to cope with present and future problems affecting these areas due to the actions funded through this program. The importance of CZM funding in making these achievements possible is significant.

Little Manatee River Project This project is one of four main estuarine areas being funded through the Estuarine Initiative. The objective of this project is to develop a comprehensive, basin-wide management program for the Little Manatee River watershed, involving Federal, state, regional, and local agencies. The project will also serve as a prototype for similar efforts in other watersheds in the Tampa Bay system, with the long term goal of enhancing the overall health of the bay.

The Tampa Bay area is one of the fastest growing regions in the State. Impacts of this growth on the Tampa Bay estuarine system have been the subject of numerous scientific investigations and have triggered a variety of efforts related to controlling point sources of pollution, habitat destruction and other negative activities. The State recognizes that if they are to be successful, these projects must be better coordinated and must be conducted within a broader, basin-wide management perspective. They must also focus clearly on controlling nonpoint source pollution, maintaining historic freshwater inflows to the estuary, and integrating consideration of living resource management efforts in local and regional capital improvement programs and comprehensive plans.

The Little Manatee River is a priority tributary of Tampa Bay, providing nursery habitat for many fish species, and is critical to the quality of the state aquatic preserve in the area. This area is the last major river of the Tampa Bay system remaining in relatively natural condition. Although there has been considerable state, regional and local interest in the area, local governments have been unable to develop a comprehensive management plan for the watershed primarily due to a lack of funding and intergovernmental support. The Initiative will foster such a comprehensive plan.

Phases 1 and 2 of the project have been completed. Work elements completed during Phase 1 include the collection of chemical, hydrological, and biological data from the Little Manatee River and identification of sources and acquisition of land use information for incorporation into a geographic information system (GIS). In Phase 2, riverine data was analyzed to develop a hydrological characterization of the watershed, rating curves and fluxes of dissolved and particulate nutrients, and characterization of biological communities. The land use information was entered into the GIS.

Evaluation and future efforts: Estuarine Initiative

Phase 3 of the project, now underway, involves a coordinated effort by DER/CZM, Department of Natural Resources, Southwest Florida Water Management District, and Hillsborough County to develop the management plan for the Little Manatee River. As a result of the progress made using CZM support, the Phase 3 effort is being jointly supported by CZM and the Florida SWIM program.

The CZM funds have provided the management tools and leadership focus necessary to leverage State, regional and local funding and provided continuity of effort toward achieving priority goals and objectives. This has influenced State legislation and made possible ongoing State, regional and local programs to help manage the Tampa Bay system.

Project results are intended to improve the overall management of local and State programs affecting the Tampa Bay area and provide the basis for integrating local land use, environmental protection and stormwater management programs with the ongoing effort of State agencies charged with water quality and habitat protection.

C. MARINA SITING IN SOUTH CAROLINA

Overview and problem

The South Carolina coastal zone contains more tidal marsh than any other Atlantic coast state. The ecological importance of wetlands and other estuarine aquatic habitats is well established. Population growth, development and recreational demands, however, continue to threaten wetlands, jeopardizing their value as wildlife habitat, nurseries for finfish and shellfish, and as filters for natural and man-made pollutants.

Marina construction can destroy productive estuarine areas through dredging and bulkheading. Shading, maintenance dredging, and various forms of water quality degradation create continuing stresses on wetlands adjacent to marinas. Improper marina siting and design can heighten wetland stress through inadequate tidal flushing, sedimentation control, and stormwater management practices. Marinas often indirectly create adverse effects through increased residential and commercial development, road construction, and related activities.

Development and administration

Two state agencies play a key role in reviewing marina permits in South Carolina:

- The South Carolina Coastal Council (SCCC) is responsible for permitting in tidal areas. The SCCC considers permits in the context of its marina policies and other coastal zone management considerations established in the South Carolina Coastal Management Program; and

- The South Carolina Department of Health and Environmental Control (DHEC) issues a water quality certification under §401 of the Clean Water Act. Additionally, marinas must meet DHEC requirements for sanitation, fuel, sewage, and related facilities.

Under the South Carolina Coastal Management Act of 1977, the SCCC has direct permitting authority for activities in the "critical area," which includes estuarine and salt marsh areas, and indirect permitting authority through certification reviews throughout the eight coastal counties. The SCCC has signed agreements with State agencies outlining the consultation process. The SCCC is active in developing a regulatory framework to protect tidal wetlands. Anticipating increased demands for new marina construction and recognizing problems in existing marina operations, the SCCC in 1984 developed comprehensive requirements for new marina siting and operations.

Marina siting criteria

According to SCCC policies, marinas should be sited and designed to:

- Minimize adverse effects on wetlands, wildlife habitat, and marine resources;
- Take advantage of physical characteristics so as to minimize dredging and shoreline fill and excavation;
- Avoid disrupting currents and ensure that all docking areas, turning basins, and navigation channels flush adequately with the tides;
- Build where possible open dockage which leads to deep water instead of boat basins, and where feasible, dry storage instead of wet slips;
- Provide for proper handling of petroleum products, sewage, waste and other refuse consistent with DHEC specifications; and
- Construct boat maintenance facilities on dry land and provide for residue control.

Finally, marina developers must demonstrate to SCCC satisfaction that public demand for the facility exists.

To assist marina developers, the SCCC published a document detailing step-by-step procedures for engineering and environmental analyses which are required in the permit application. The Council published a marina operations handbook, presenting the policies for managing the primary environmental risks in coastal marinas. The operations manual also recommends management rules and regulations to help protect adjacent waters.

Before filing a permit application, developers must meet with SCCC and DHEC for a pre-application conference to discuss the project, identify major obstacles to constructing the proposed marina, (such as proximity to shellfish beds) and decide on the scope and depth of the Coastal Marina Report (CMR) required by the permit application. The CMR includes engineering evaluations of marina siting and design, environmental assessments of the site, and technical studies of dredging requirements, tidal flushing, and other considerations.

The CMR is a comprehensive review of the proposed marina and its effects and includes:

- A description of the proposed project (siting justification, dredging and spoil disposal plans, construction drawings, and a demonstration that the marina project is needed);

- A description of the existing environment (hydrology, water quality studies, soils characterization, a review of the area's terrestrial and aquatic ecosystem, historical and archeological sites, the local economy and land uses, and an evaluation of the available public facilities), and consideration of aesthetic values;

- An environmental impact assessment (a review of pollution loadings from stormwater runoff, and direct boat discharges in the context of state water quality standards, impacts on soils, and effects on the aquatic and terrestrial ecosystems);

- A review of measures taken to mitigate the effects described in the environmental impact assessment;

- A summary of unavoidable adverse and beneficial impacts on water quality, ecosystems, historical sites, local economy, public infrastructure, and aesthetic values; and

- A complete marina operations and maintenance plan.

Marina operations criteria

As part of the permit application package, the marina developer submits a marina operations and maintenance (O&M) plan acceptable to the SCCC, DHEC, and the U.S. Coast Guard. Should the SCCC issue the permit, the operations and maintenance plan becomes a permit condition. Required components of the O&M plan include:

- Water quality management: O&M plans must address sewage disposal, fuel pumping precautions, and a complete regime of water quality sampling and testing. Where appropriate, the SCCC consults with DHEC and/or requires DHEC certification of procedures and equipment.

- Maintenance dredging/disposal and shoreline construction operations: The plan must describe the extent of maintenance dredging anticipated and mitigation measures to be taken. The plan must certify that all spoil will be disposed of in permanent upland sites and must describe those sites and their preparation. Further, the SCCC must be notified of any maintenance dredging 30 days before it takes place; a report of the activity must be filed with the SCCC upon conclusion of each maintenance dredging activity. Dredging is permitted only from December 1 to March 1.

- Shoreline construction approved in the permit must follow accepted practices such as the use of silt screen and/or absorbent material to isolate construction activity from natural waters. The O&M plan must include a description of all techniques used to protect the environment.
- Oil pollution management: The O&M plan must contain a comprehensive oil spill response and clean up plan. The O&M plan must also include procedures for transferring and handling fuel and other petroleum products.
- Sewage pollution management: Plans must include a comprehensive sewage spill response plan and procedures for transferring and handling sewage. No liveaboards are permitted.
- Hurricane/severe weather operations: Marina operators must develop a hurricane response plan and have on hand necessary equipment and supplies. The plan must include standard operating procedures for early planning, evacuation, and recovery.

The SCCC issues a three-year renewable marina permit. Should the Council modify its policies and requirements, those modifications may become permit conditions either during the life of a permit or at the renewal stage. During renewal proceedings, the Coastal Council may reduce the size of or change the configuration of the marina to prevent further water quality degradation. The SCCC will also consider the marina's pattern of compliance with permit conditions and the efficacy of monitoring and other required programs already in place.

The SCCC enforcement staff regularly inspects coastal marinas for compliance with permit conditions and terms. The Council may impose administrative fines and penalties.

Evaluation and future efforts

The policies and guidelines developed by the Coastal Council have helped ensure that coastal marinas minimize estuarine resources loss, including wetlands and other adverse environmental effects, during a time of significant population growth and demand for new marina facilities. However, recognizing that such growth will continue indefinitely, the Council has launched a review of its marina regulations to evaluate whether existing regulations are adequate to protect wetlands, water quality, and coastal resources.

Among policies under evaluation are:

- Zoning waters under SCCC jurisdiction to prohibit or severely restrict marinas and other uses of non-degraded estuarine areas;
- Replacing wet slip construction with dry stack or lock basin marinas unless such alternatives are not possible; and
- Encouraging local governments to develop comprehensive shoreline use plans and zoning regulations.

At this time, there is no agreement within the SCCC on the appropriate scope of these policies, or whether they should be adopted.

D. WATERSHED MANAGEMENT IN WASHINGTON

Overview and problem

Historically, Burley Lagoon and Minter Bay, located within Pierce and Kitsap Counties, have been very productive for clam, oyster, and mussel rearing, spawning, and harvesting. Increasing nonpoint source fecal coliform bacterial contamination of these watersheds has resulted in the partial or complete closure of shellfish beds since 1978.

As a rural area, the nonpoint sources of contamination from the various land uses include agricultural waste from farms, inadequate on-site sewage disposal systems, and construction related impacts. A marked expansion of rural development and population, particularly along small creeks and streams which ultimately discharge to the watersheds, has resulted in an increase of bacterial contamination, and a detrimental impact on water quality in the watersheds.

Since 1984, the Washington State Department of Ecology's (DOE) Shorelands and Coastal Zone Management Program has taken an active role in the effort to correct the bacterial problems in Burley Lagoon and Minter Bay. DOE has conducted an extensive water quality survey the purpose of which was to analyze existing nonpoint pollution sources, reduce the inundation of fecal coliform contamination, and work towards the reopening of commercial and recreational shellfish beds. DOE is lending further support by funding the development of a Basin Water Quality Plan, and providing both technical assistance and regulation enforcement.

Development and administration

The Washington State Department of Social and Health Services (DSHS) routinely uses fecal coliform levels to determine the viability of commercial shellfish operations. Due to rising fecal coliform levels in the late 1970's, Burley Lagoon was closed for commercial harvesting of oysters in 1981, followed by Minter Bay in 1982. These two areas remain closed.

In March 1984, DOE, through its State Shellfish Protection Strategy, completed a comprehensive study that analyzed the existing water quality conditions within the Burley and Minter watersheds. The objectives for this study were to:

- Determine baseline levels of fecal coliform bacteria;
- Locate specific sources of bacterial contamination;
- Evaluate nonpoint source pollution associated with various land uses;
- Estimate the total annual fecal coliform load;

- Relate environmental and water quality data to levels of shellfish contamination;

- Recommend methods for reducing or controlling existing coliform sources and preventing further pollution; and

- Develop a standardized approach for investigating future sanitation problems.

The study concluded that the main contributors to fecal coliform contamination were the nonpoint sources of failing on-site septic systems, and wastes from domestic animals.

Evaluation and future efforts

In response to the study, Pierce County adopted new, more stringent requirements related to minimum soil absorption levels, and the installation of septic systems, while Kitsap County adopted larger minimum lot sizes.

Several important projects have been completed, including fencing of creeks, stormwater runoff control, and better pasture management have been completed: thirteen farm plans were adopted; 7,620 feet of fencing was installed; 500 feet of stream bank stabilization measures were instituted; 566 acres of pasture were protected; 2.9 miles of vegetative streamside buffers were created; 950 on-site septic systems were inspected; and 49 septic systems were found failing and corrected.

The study concluded that the most effective long-term solution to the pollution problem in the Burley and Minter watersheds was to implement regulatory measures to manage drainage, animal keeping practices, and on-site septic systems. To this end, Pierce and Kitsap Counties received grants from DOE to develop a Basin Water Quality Plan (plan) which was completed in 1988.

Throughout the plan's development, the counties have worked closely with state agencies, including DOE, which participated in the citizen meetings during which where most of the implementation measures were proposed. As the plan is implemented, the counties and state will continue to coordinate activities to assure that implementation is proceeding effectively. The plan recommends that DOE conduct water quality monitoring in conjunction with, or in addition to, monitoring by the County Health Department, and provide technical assistance for the plan's implementation and future evaluation. The plan further states that continued financial support from Federal programs, such as Section 205j of the Clean Water Act and the Coastal Zone Management Program, for projects directed at improving water quality will be sought.

E. STORMWATER MANAGEMENT IN NEW JERSEY

Overview and problem

The New Jersey Coastal Program provides a good example of how a coastal program has served as a catalyst to regulate new development for stormwater impacts improve stormwater standards. The Coastal Program adopted stormwater runoff policies in 1986 and uses them in reviewing all permits in the coastal zone. In 1989, the Coastal Program completed a report entitled Stormwater Management in the New Jersey Coastal Zone, which evaluated existing practices and recommended several innovative techniques for the regulatory program.

Stormwater management is designed to compensate for the added stormwater runoff and pollution caused by development. When land that was formally undeveloped becomes covered with parking lots and buildings, rain water can no longer be absorbed into the ground. Unless properly managed, this excess water can overflow into streams causing erosion and downstream flooding. Most stormwater management ordinances require that peak flows be controlled on site and that the pollutants gathered in the stormwater be cleansed. Ideally, storm-water controls will apply along an entire watershed, not just along the coast, thus capturing the nonpoint pollutants at upstream sources.

The Atlantic Basin Watershed

The Atlantic Basin, with a drainage area of 2,059 square miles, stretches from just south of Sandy Hook to just north of Cape May. Generally, it encompasses the State's Atlantic coastline. The Atlantic Basin has a population of over 1.2 million and is rapidly growing.

For that portion of the watershed which is not subject to a coastal permit, development projects are subject to town zoning and building codes. New Jersey published a compendium of design guidelines for erosion and sediment control in 1974, which have been incorporated into most municipal ordinances within the Atlantic Basin. Some counties within the basin also have specific design criteria for subdivisions which emphasize groundwater recharge of stormwater.

Development and administration

The New Jersey Coastal Program, located in the Division of Coastal Resources in the Department of Environmental Protection, issues permits for all development immediately adjacent to the coast and for large scale development up to 24 miles inland. The Coastal Program also passes Federal CZM funds through to localities to encourage better land use decisions at their level.

Stormwater criteria

The Coastal Program requires that stormwater criteria be met for any development needing a coastal permit. All development immediately adjacent to wetlands and coastal waters also needs such a permit. Only larger scale developments need permits further inland (i.e., housing developments of more that 24 units, commercial areas providing more than 300 parking spaces). A permit is based on a three-step process which takes into consideration the location of the project, the proposed land use and the resource policies.

The regulations addressing stormwater runoff are contained within the resource policies. These policies call for best available technology to minimize off-site runoff, increase on-site infiltration, simulate natural drainage systems and minimize off-site discharge of pollutants to ground or surface water, and encourage natural filtration functions.

Best available technology may include measures such as retention basins, recharge trenches, porous paving and piping, contour terraces, and swales. Eliminating curbs, reducing roadway widths and rooftop recharge basins are strongly encouraged.

The key standard relevant to flood and erosion control is that detention requires that volumes and rates be controlled so that after development, the site will not generate a greater peak runoff than prior to development. The key standard relevant to water quality control is to detain a one year frequency 24-hour storm or a storm of 1.25 inches of rainfall in two hours.

Because of concern for impacts on groundwater infiltration, the State has discouraged detention ponds in areas where there are seasonally high water tables, and has required that detention ponds or swales be sited as far horizontally from surface water and as far vertically from ground water as is practical.

Evaluating best management practices and future efforts

The Coastal Program has just completed a review of the stormwater practices they have been requiring and have made several findings.

- More attention needs to be placed on "Minimum Disturbance/Minimum Maintenance Site Development" which stresses the importance of vegetated buffers. Particular emphasis is placed on using vegetation which does not need chemical fertilizer applications. Given that much of existing and projected development in the Atlantic coastal drainage is seasonal or tourism related, the elimination of costly and time-consuming maintenance requirements such as lawn mowing, fertilizing and spraying, may be attractive to absentee owners and to the growing retirement oriented population.

- More use of porous paving is recommended because it is an effective way of naturally removing pollutants, assuming that necessary soil and other standards are met. Maintenance of paving and monitoring of nearby wells would be required with a permit.

- Dual purpose detention basins for impervious or paved area runoff are recommended in nontidal areas. Dual purpose basins will not only detain stormwater but will capture the "first flush" of stormwater which contains the bulk of pollutants--i.e. particulate matter and hydrocarbons. These basins can capture from 40 to 90 percent of pollutants and yet can add little to the construction of a retention basin already needed for flood control purposes.

F. NEW YORK INVOLVES LOCAL GOVERNMENTS

Overview and problem

One of the problems in implementing nonpoint source policies and best management practices has been to incorporate them into regular day-to-day land use decisions. With the exception of a few states which require a state permit for development projects, local governments have the primary authority to implement nonpoint pollution policies.

The New York Coastal Program addresses nonpoint source pollution through a number of ways including the Local Waterfront Revitalization Programs (LWRP). Locally developed LWRPs identify nonpoint source pollution problems and develop implementation techniques to prevent and control nonpoint source pollution by developing water quality goals and non-point source prevention and control standards.

This approach to addressing nonpoint source pollution has several advantages. It takes advantage of existing land use regulatory processes and hence does not require new legislation. Cities, towns and villages implement their nonpoint policies by revising zoning, subdivision and other ordinances. The other advantage is that standards may differ depending upon local circumstances. Intensely developed communities tend to rely more upon structural controls and techniques, such as requiring the collection, treatment, and disposal of runoff prior to release into ground or surface waters, while less developed communities tend to rely upon development-limiting, non-structural controls, including the adoption of restrictive zoning standards which limit the type and intensity of land use in coastal areas.

Criteria for best management practices by local governments

The most common approaches taken by coastal communities include developing nonpoint source runoff standards in local zoning ordinances or other local laws. Typical standards or best management practices include the following:

- Deleting from calculations of minimum lot size, lot yield, density, building and coverage, those "environmentally sensitive lands" such as steep slopes, freshwater and tidal wetlands, areas of shallow groundwater, highly erodible soils and bluffs. This would result in less land being developed and more left in open space.

- Adopting a "Zero Additional Runoff" standard which prohibits runoff from sites during and after construction that is greater than predevelopment conditions. In some cases, a "zero runoff" standard may be applied, requiring that all runoff be contained and recharged on-site using such techniques as leaching catch basins, sediments basins, detention ponds, recharge basins, biofiltration basins and wetlands.

- Requiring the retention of natural drainage swales, land contours and native vegetation, and minimizing grading operations on construction sites.
- Prohibiting the installation of street curbs in selected areas in order to allow runoff to infiltrate soils adjacent to roadways, rather than being channeled to a body of water, and by restricting the width of roadways in new subdivisions to reduce runoff by reducing impermeable paved areas.
- Requiring buffer areas adjacent to wetlands and surface waters, and prohibiting the removal or disturbance of native vegetation in buffer areas to allow settling of particulates and biological uptake of nutrients and pollutants by vegetation.
- Limiting impermeable paved surfaces near surface waters and in drainage basins by limiting the amount of land that may be covered by buildings and impermeable surfaces, and by requiring the use of permeable materials in parking areas near surface waters.
- Prohibiting land uses and activities in coastal areas which contribute to substandard water quality or which have the potential to pollute.
- Requiring during the site plan review process, that roadways, pathways, driveways and structures be located as far from surface waters as possible, and requiring that certain natural features such as drainage swales are retained.
- Authorizing the "Transfer of Development Rights" in order to move activities and uses which contribute to nonpoint source pollution out of sensitive coastal areas.
- Rezoning wetlands and floodplain areas as "conservation and open space" zones, and rezoning underwater lands and lands below mean high water as "estuarine" zones. Conservation and open space zones serve primarily as buffer and treatment areas, while estuarine zones restrict uses and activities to those uses and activities which are less likely to result in contributions to substandard water quality.
- Authorizing cluster zoning to preserve open space and to reduce impermeable surfaces.

- Establishing local vessel waste no-discharge zones, requiring the installation of vessel waste pump-out facilities at new and expanded marinas, and requiring public restroom facilities at all marinas.

- In those communities which regulate dredging and dredge spoil disposal, requiring dredging "windows" which restrict dredging activities to the late fall and winter months, and prohibiting reintroduction of polluted sediments into surface waters, on underwater lands, or in proximity to surface waters, and requiring the use of sediment control techniques including sediment curtains, hay bales and berms to prevent pollutants and sediments from re-entering surface waters.

- Restricting motorized vessel operation in shallow nearshore areas and wetlands to reduce erosion, sedimentation, and sediment and pollution suspension due to vessel wakes and propeller wash.

Evaluation and future efforts

Local governments use different techniques to implement these practices. Some may be applying the policies only to new developments, while others may be requiring that existing development meet new runoff standards or implement nonpoint source best management practices by "phasing in" standards over time or within five years of adoption of the standards.

During local waterfront plan development there has been recognition of the need for more data and more specific techniques to address nonpoint sources. CZM and participating communities are undertaking specific studies, such as the stream corridor study described on page 22 to, in part, determine if techniques to address specific nonpoint source pollution problems can be identified now, and if not, to determine what information and/or research is needed to do so.

There are 250 coastal municipalities in the New York coastal zone. Participation in the coastal program is voluntary. Over 115 municipalities are now participating in developing local waterfront revitalization plans. This represents 70 percent of the coastline and 90 percent of the coastal population. To date, 22 municipalities have completed their plans, all of which incorporate nonpoint source pollution policies.

LOCALITIES AND STATE UNITS GET FUNDS FOR 41 COASTAL RESOURCE PROJECTS

Twenty-one local governments and eight planning districts in Virginia's Tidewater region—from Northern Virginia to Hampton Roads and the Eastern Shore—are benefiting from a federal grant to carry out coastal resource management projects. This is the third year Virginia has participated in the federal-state-local program.

Half of Virginia's 1988-89 fiscal year grant of $1,786,000 is devoted to assisting local projects. The other half is being used by eight state agencies for 20 projects. The money is provided by the National Oceanic and Atmospheric Administration, a branch of the U.S. Department of Commerce.

Reservation of half of the funds for local activities is a long-standing commitment the Commonwealth made with the NOAA in establishing the Virginia Coastal Resources Management Program.

Fifteen counties and six cities and towns are sharing the funds to conduct projects ranging from $10,000 to $25,000. Almost half of the efforts are related to development or revision of local comprehensive plans in order to protect the jurisdictions' sensitive coastal zone resources.

Local matching money totals $3 787. Added to the federal funds, the local ects will cost about $1.25 million ies are contributing almost deral allocations.

Overall

model and an interface with the Geograp formation System for the region, includin evaluation and a nonpoint source polluti trol project review. A groundwater prot handbook and suggested ordinances for water management are being developed Southeastern Virginia PDC. Both are do work with $25,000 grants. This is in addi basic grants given to each Tidewater pl commission for technical coastal managem sistance to localities within their districts.

Ten local governments are working o comprehensive plans, conducting project as creating coastal and natural resource nents; developing regulations to implemen land use plan and an environmental revi dating a plan to set standards for urban and management to ensure coastal prot adding a shoreline management section i dated comprehensive plan; emphasizing and water quality; establishing guide velopment; and revising county de dinances to enable handling of m mental pressures.

Other projects to protect clude addition of a position for land-use planning an ment of stormwater m line and King George Wight County's the relationship ment, protecti tion of envir ment of a County;

Nature group buys island

Purchase ends plans to develop Permuda

Cleaning Bronx River, Making Room for Fish

By SAM HOWE VERHOVEK

Cleaning up the Bronx River is not an easy proposition. In just one sweep of the waterway in the West Farms section of the Bronx several years ago the catch amounted to 6 cars, 2 horse trailers, 53 refrigerators, 3 sofas and most of an upright piano.

Still, there are people who are committed to the task, and many of them belong to the Bronx River Restoration Project, now in the 15th year of its efforts to reclaim the banks and waterways of the 23-mile river, which runs from Kensico Dam in the Westchester County hamlet of Valhalla to Clason's Point in the South Bronx.

Mobile Register

Oyster beds saved by compromise

By EARL SWEATT
Press Register Reporter

Court affirms development curbs for some farmland, coastal zones

State enlarging role in preserving sites

WAILUKU — The state will take a more active role in protecting prehistoric and historic sites, the deputy director of the Department of Land and Natural Resources said yesterday.

Libert Landgraf said the department will make its historic sites office a separate division within the department with greater authority to deal with historic preservation issues. The move was mandated in the last legislative session.

At the same time, land department Director William Paty is setting up advisory councils to review and make recommendations on historic sites on each island, Landgraf said.

Landgraf offered the comments during a ceremony to sign an agreement to restore the Honokahua burial site at the Kapalua Resort.

The Office of Hawaiian Affairs, representatives of a Ha-

vated site.

The reburial agreement provides for the remains taken out last year to be returned to approximately the same place from which they were removed. Kapalua will be responsible for the restoration and maintenance of the burial ground.

There would be public access across the site to the beach and the site itself would be open to the public. It would be nominated for listing on the state and national registers of historic sites.

The excavation controversy also fueled legislative interest in protection of other ancient Hawaiian burial sites and archaeological sites.

Tavares and Landgraf said yesterday they expect the Legislature to develop new laws on historic preservation. The upgraded historic sites division "may well have greater author-

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Joint effort backed on watershed regulation

8-9-88 Raleigh N-C

By SEAN M. BAILEY
Staff writer

In a move to bring uniformity to inconsistent rules governing development in the Falls Lake watershed, a City Council panel recommended Monday that a joint city-county committee be appointed to draft consistent watershed regulations.

The recommendation by the council's Public Works Commit-

long debated whose watershed restrictions are the toughest. The regulations are important because they control the degree of development allowed in the watershed, which drains into Raleigh's primary source of drinking water, Falls Lake.

"This is an attempt to resolve that and get it straightened out all at once," committee chairman Charles C. Meeker said in an interview. "Our hope is that we can agree on a standard that will

toward arriving at a regional watershed standard.

Wake commissioner Larry B. Zieverink said in an interview that he welcomed the Raleigh proposal and agreed that it would boost the effort to arrive at regional watershed controls.

"Everybody lives in someone's watershed, and we need to get the state to take a more active role in this," Zieverink said.

While both governments limit

total lot size. Wake allows up percent hard surfaces on its dential lots in the primary w shed.

During a rain, water d rapidly off hard surfaces picks up impurities as it r through the watershed, thus tributing to pollution.

While no suggestions made about specific regula Louis A. Jones, a Raleigh res who often appears before co

IV. AN OVERVIEW OF COASTAL MANAGEMENT

What is the coastal zone?

- The coastal zone is the dynamic area where the land meets the sea. It includes coastal waters and the adjacent shorelands; areas which strongly influence one another. It is composed of open waters, estuaries, bays, inlets, lagoons, marshes, swamps, mangroves, beaches, dunes, bluffs, and coastal uplands.

- The United States has over 95,000 miles of shoreline, including the Great Lakes. The shoreline ranges from the rocky cliffs of Maine to the broad Louisiana wetlands to the rich Hawaiian coral reefs. The wide climatic range is seen in the frozen coastal plain of Alaska and the mangrove swamps of Florida.

- The uses of the coastal zone are as diverse as its physical forms, including: housing, recreation, wildlife habitat, resource extraction, fishing, aquaculture, transportation, energy generation, commercial development, and waste disposal.

Why is it important?

- More than half of the U.S. population resides in the coastal counties, on less than 10 percent of the nation's land. The coastal counties are five times denser in population than non-coastal counties, 10 times denser along the Atlantic coast. This population continues to grow dramatically.

- The 189 commercial ports in the U.S. coastal zone moved 1.3 billion tons of cargo in 1986 alone.

- Almost 40% of the industrial facilities in the U.S. are within the drainage basin of the Great Lakes. Over half of Canada's industry is within the Great Lakes drainage basin.

- Wetlands currently number about 11 million acres within the coastal zone. Wetlands serve as spawning, nursery, and feeding grounds for over 60 percent of the saltwater fish and shellfish harvested annually in the U.S. This harvest is valued at over $30 billion. The commercial and recreational fishing industries contribute $17 billion and $13.5 billion, respectively, to the U.S. economy annually.

- Marine aquaculture is a growing industry. In 1986, the culture of Pacific salmon, shrimp, mussels, clams and oysters totaled 52,000 tons, valued at $89 million.

- Development pressure is three to four times greater in coastal areas than in the rest of the country. Peoples' desire to be near the coast has resulted in the development of areas vulnerable to coastal storms. The Federal Flood Insurance Program, which insures structures in flood prone areas, represents the Federal government's second greatest liability, second only to Social Security. As of August 1987, there were 64,000 policies under the Flood Insurance Program in coastal high hazard areas or v-zones; coverage valued at $5.2 billion.

- Coastal recreational facilities and water dependent uses, such as energy development and ports, must be sited in limited shoreline areas. Accommodation of such competing uses is important and extremely challenging.

- Coastal areas provide habitat for millions of waterfowl and other wildlife, including 100 threatened and endangered species.

What must state CZM programs address?

- The requirements for state coastal programs, set forth in Federal regulations, emphasize the need for comprehensive, predictable, and enforceable policies to guide coastal regulatory, planning, and public investment programs. The requirements identify the range of issues that states must consider in developing their programs (e.g., wetlands protection, erosion control, public access, water-dependent facility siting), yet provide flexibility for criteria that allow states to design programs that meet their particular needs. Broad public review of the programs by state agencies, Federal agencies, and interest groups is achieved through public hearings in the states and National Environmental Policy Act review prior to OCRM approval of the state CZM programs.

What kind of funding does the CZMA provide?

- States have an incentive to participate in the Federal program because of the availability of Federal funds. Section 305 program development funds, awarded from 1972-1979, have been phased out. Section 306 program implementation funds continue to be available and are allocated to states with approved programs based on a formula set by state coastal population and shoreline mileage. In Fiscal Year 1990, 29 states and territories will receive Section 306 grants totalling $35.3 million. Eight states receive the maximum award of $2 million and five states received a minimum award of less than $500,000.

- The average award was $1.15 million. States are required to match the Federal funds, dollar for dollar. Over the last decade, increases in the number of states with approved programs and inflation have drastically reduced Federal implementation funds available to states. Funding has remained relatively constant at $33 million per year.

What are the other important aspects of the CZMA?

- The Federal consistency provisions under Section 307 of the CZMA provide another important incentive for state participation. Federal activities, permits, or funding, which significantly affect a state's coastal zone, must be consistent with the enforceable elements of the state's federally-approved CZM program. The intent of the Federal consistency process is to ensure that Federal agencies adhere to the state comprehensive plans and to foster consultation and coordination between Federal and state agencies in order to resolve conflicts at the earliest stages of project/program development.

What is the future of coastal management?

- Coastal management programs are dynamic. They are changing to address emerging coastal issues such as sea level rise, coastal pollution, marine debris, and wetlands protection. States respond by developing new program policies or regulations, often with Federal funds. OCRM encourages states to improve their management programs through recommendations resulting from the periodic evaluation of state programs.

V. LIST OF STATE COASTAL PROGRAMS

Alabama
Coastal Resources Div.
Dept. of Economic and Community Affairs
P.O. Box 2939
Montgomery, AL 36105
(205) 284-8778

Alaska
Division of Governmental Coordination
431 North Franklin
Juneau, AK 99811-0165
(907) 465-3562

American Samoa
Development Planning Office
Government of American Samoa
Pago Pago, AS 96799
(684) 633-5155

California
California Coastal Commission
631 Howard Street, 4th floor
San Francisco, CA 94105
(415) 543-8555

Connecticut
Dept. of Environmental Protection
18-20 Trinity Street
Hartford, CT 06106
(203) 566-7404

Delaware
Dept. of Natural Resources
and Environmental Control
89 Kings Highway
Dover, DE 19903
(302) 736-4403

Florida
Dept. of Environmental Regulation
Twin Towers Office Bldg.
2600 Blair Stone Road
Tallahassee, FL 32301
(904) 488-6221

Guam
Bureau of Planning
P.O. Box 2950
Agana, GU 96910
(671) 472-4201

Hawaii
Office of State Planning
State Capitol, Room 700
Honolulu, HI 96813
(808) 548-3026

Louisiana
Coastal Mgmt. Div.
Dept. of Natural Resources
P.O. Box 44487
Baton Rouge, LA 70804
(504) 342-7591

Maine
State Planning Office
State House Station #38
Augusta, ME 04333
(207) 289-3261

Maryland
Coastal Resources Div.
Dept. of Natural Resources
Tawes State Office Bldg.
Annapolis, MD 21401
(301) 974-2784

Massachusetts
Office of Environmental Affairs
100 Cambridge Street
Boston, MA 02202
(617) 727-9530

Michigan
Land & Water Mgmt. Div.
Dept. of Natural Resources
P.O. Box 30028
Lansing, MI 48909
(517) 373-1950

Mississippi
Coastal Programs
Bureau of Marine Resources
2620 West Beach Blvd.
Biloxi, MS 39531
(601) 385-5860

New Hampshire
Office of State Planning
2 1/2 Beacon Street
Concord, NH 03301
(603) 271-2155

New Jersey
Dept. of Environmental
Protection, CN 401
Trenton, NJ 08625
(609) 292-2795

New York
Department of State
162 Washington Street
Albany, NY 12231
(518) 474-3643

North Carolina
Div. of Coastal Mgmt.
Dept. of Environment, Health, and Natural Resources
512 N. Salisbury Street
Raleigh, NC 27611
(919) 733-2293

Northern Mariana Islands
Coastal Resources Mgmt. Office
Nauru Building
Saipan, MP 96950
(670) 234-6623

Ohio
Dept. of Natural Resources
Fountain Square
1930 Belcher Drive
Columbus, OH 43224
(614) 265-6877

Oregon
Dept. of Land Conservation
and Development
1175 Court Street, N.E.
Salem, OR 97310
(503) 378-4017

Pennsylvania
Div. of Coastal Zone Mgmt.
Dept. of Env. Resources
P.O. Box 1467
Harrisburg, PA 17120
(717) 541-7808

Puerto Rico
Dept. of Natural Resources
P.O. Box 5887
Puerta de Tierra, PR 00906
(809) 724-5516

Rhode Island
Coastal Resource Mgmt. Council
Stedman Office Bldg.
Tower Hill Road
Wakefield, RI 02879
(401) 277-2476

San Francisco Bay Conservation & Development Commission
30 Van Ness Avenue, Room 2011
San Francisco, CA 94102
(415) 557-3686

South Carolina
S.C. Coastal Council
AT&T Capitol Center
1201 Main Street, Suite 1520
Columbia, SC 29201
(803) 737-0880

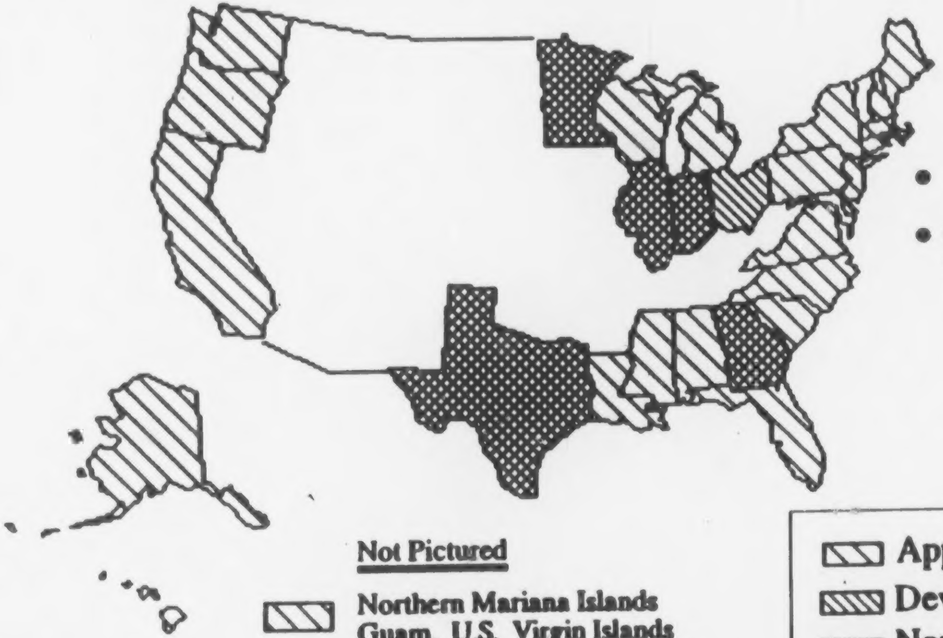
U.S. Virgin Islands
Dept. of Planning and Natural Resources
Nisky Center, Suite 231
No.45A Estate Nisky
St. Thomas, VI 00802
(809) 774-3320

Virginia
VA Council on the Environment
903 Ninth St. Office Bldg.
Richmond, VA 23219
(804) 786-4500

Washington
Department of Ecology
State of Washington (PV-11)
Olympia, WA 98504
(206) 459-6777

Wisconsin
Coastal Mgmt. Program
Dept. of Administration
101 South Webster, 6th floor
Madison, WI 53707
(608) 266-3687

State Coastal Management Programs



- 29 Approved Programs
- Cover 94% of the Nation's shoreline (89,117 mi.)

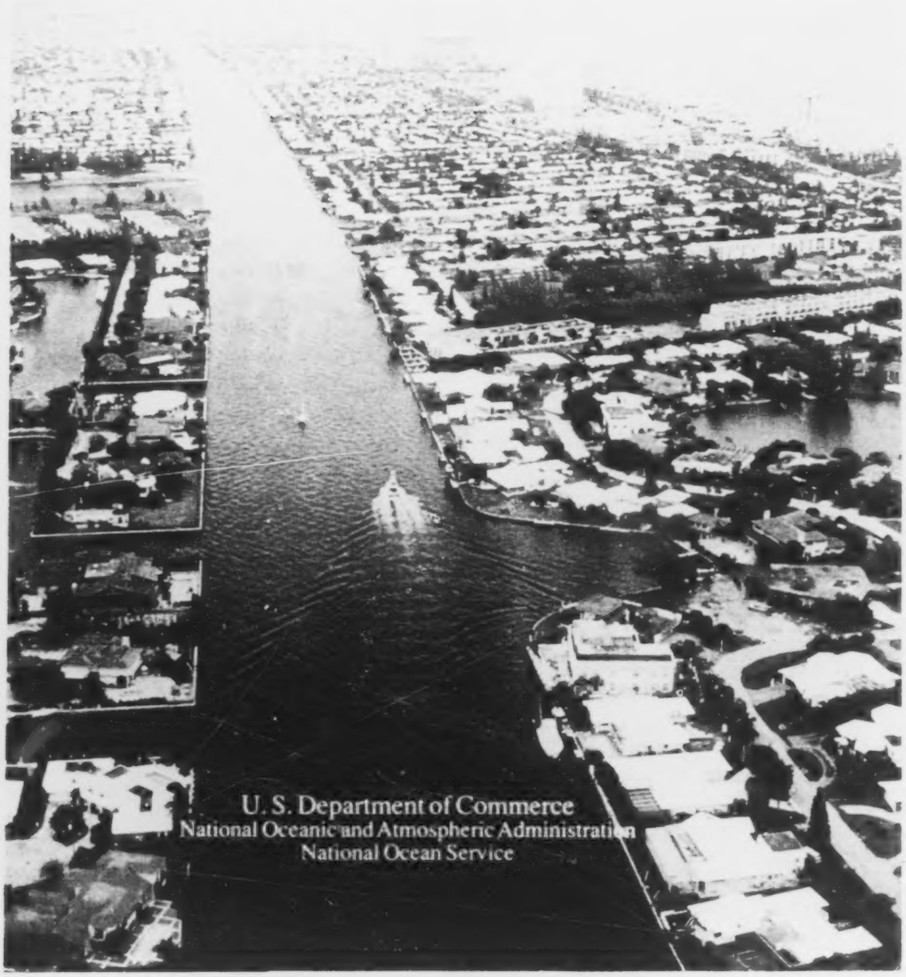
Not Pictured

▧ Northern Mariana Islands
Guam, U.S. Virgin Islands
American Samoa, Puerto Rico

▧ Approved
▨ Developing Program
▩ Non-Participant

A Special Earth Week Report

50 Years of
Population Change
along the Nation's Coasts
1960-2010



U. S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service

Coastal Trends Series

Publication of a coastal trends report series is a new and evolving activity of the Office of Oceanography and Marine Assessment (OMA) of the National Oceanic and Atmospheric Administration (NOAA). The series will investigate and illustrate the effects of current and projected development in the Nation's coastal areas. The series was initiated in 1989 as part of NOAA's program of strategic assessments of the Nation's coastal and ocean resources.

The series presents information on current and future development patterns and their direct and indirect effects upon our national coastal resource base. The reports are a basis for identifying patterns of resource use and environmental quality concerns about the Nation's coastal areas.

The mission of NOAA's Strategic Assessment Program is to organize and synthesize existing information and knowledge of important characteristics of the Nation's coastal and ocean regions, and to communicate this information clearly to decision-makers and their institutions, both in the public and private sectors. The assessments are characterized as "strategic" because they develop information of a nature, and at spatial and temporal scales, appropriate for: (1) setting and modifying national or regional objectives for coastal resource management; (2) identifying various means to achieve these objectives; and (3) evaluating the effects of their implementation. They are intended to complement, not replace, the detailed "tactical" analyses required to make local decisions.

Some of the data used in these reports have been presented in other NOAA publications, particularly its series of regional strategic assessment data atlases. These large-format thematic atlases present information on important features and activities in the Nation's coastal areas. Each atlas contains sections on the physical and biotic environments, living marine resources, economic activities, environmental quality, and jurisdictions of each region. An *East Coast Data Atlas* was published in 1980; an extensive revision and expansion of this atlas will begin in 1990. A *Gulf of Mexico Data Atlas* was published in 1985; a *Bering Chukchi, and Beaufort Seas Data Atlas* in 1989. A *West Coast of North America Data Atlas* is scheduled for completion in 1990.

Additional information on coastal population and NOAA's coastal trends report series is available from: Thomas J. Culliton, Strategic Assessment Branch, Ocean Assessments Division, Office of Oceanography and Marine Assessment, National Ocean Service, National Oceanic and Atmospheric Administration, 6001 Executive Boulevard, Rockville, MD 20852.

The Second Report of a Coastal Trends Series

50 Years of
Population Change
along the Nation's Coasts
1960-2010

Thomas J. Culliton, Maureen A. Warren,
Timothy R. Goodspeed, Davida G. Remer,
Carol M. Blackwell, and John J. McDonough, III

Strategic Assessment Branch
Ocean Assessments Division
Office of Oceanography and Marine Assessment
National Ocean Service
National Oceanic and Atmospheric Administration
Rockville, Maryland 20852

Introduction

Many of the Nation's coastal areas are under increasing pressures from population growth and related development. About 110 million people — almost one-half of our total population — now live in coastal areas. By the year 2010, coastal population will have grown from 80 million to more than 127 million people, an increase of almost 60 percent nationwide. Some states, including Florida, will have increased more than 200 percent.

Public concern about the quality of coastal environments has never been greater. Over the past several years, major oil spills, medical wastes on east coast beaches, shellfish bed closures, and wetlands losses have increased awareness of the serious and pervasive nature of the problem. At the same time, systematic monitoring of coastal environmental conditions through NOAA's National Status and Trends Program has documented the ubiquity of environmental problems in coastal areas. Not surprisingly, relatively high concentrations of pollutants have been measured in bottomfish, shellfish, and sediments at sites near highly populated coastal areas around Boston, New York, San Diego, Los Angeles, and Seattle (O'Connor and Ehler, 1990).

While direct causes of environmental quality problems are often difficult to document, evidence is mounting that many are the result of general coastal development patterns. Natural processes of coastal ecosystems are being disrupted, and the ecological and economic values of coastal areas threatened. Fundamental changes are occurring in the way natural systems work and look. As coastal population grows, many of the qualities that attracted people initially are diminishing.

As many coastal areas grow more crowded, the short-comings of management actions that focus on site-by-site and permit-by-permit decisions, while failing to address the more ubiquitous problems of growth and development, become more obvious. This report provides coastal managers and decision-makers with timely information about population trends in coastal areas and provides an improved basis for identifying future patterns of development. Using the best available information, the report describes recent and projected trends in the size, distribution, and density of the Nation's coastal population. Trends are examined by region, state, and county over a 50-year period, 1960-2010.

Definition of Coastal Areas

The report includes information for all 30 coastal states, including those bordering the Great Lakes, and the 451 coastal counties and 1,569 non-coastal counties in these states. It includes the District of Columbia, 23 boroughs or census areas in Alaska, and 42 independent cities in Virginia and Maryland that are "county equivalents." For this report, "coastal counties" are those identified by either the Federal Coastal Zone Management Program, managed by the National Oceanic and Atmospheric Administration, or by individual state coastal management programs.

Coastal counties are defined by various methods. States use political, physical, and cultural features to delineate coastal boundaries. Most recognize that activities miles inland can have a significant impact on the environmental quality of the coast, and have included these areas in their management programs.

The coastal U.S. has been divided into five regions to examine spatial variations of population. Four of the five regions are used by NOAA in its coastal assessment activities, including the National Estuarine Inventory (NEI) program. The Great Lakes region currently is not included in the NEI series, but is included in this report because it is heavily populated and represents a large portion of the Nation's coastal lands and waters, as defined under the Coastal Zone Management Act of 1972.

Six maps in the appendix show the coastal counties and major population centers in each region.

Population Projections

Source. Two Federal agencies, both located in the U.S. Department of Commerce, develop population projections periodically. However, *county-level population projections* are not available nationwide from either the Bureau of the Census or the Bureau of Economic Analysis (BEA). Although BEA county-level projections are available for seven coastal states in the Southeast and Gulf of Mexico, no projections have been made for other coastal states. Consequently, two economic forecasting firms were identified as data sources, National Planning Association Data Services, Inc. (NPA) and Woods and Poole Economics, Inc., both located in Washington, DC.

The NPA and Woods and Poole state-level projections for 2000 were compared with BEA projections for the seven southeastern and Gulf states and with Bureau of the Census projections. The NPA projections, on average, were about two percent greater than the BEA projections, and about two percent less than those developed by the Bureau of the Census. NPA underestimated the Woods and Poole projections by about four percent. Because the NPA projections were closest to the Bureau of the Census projections, and were more conservative than the Woods and Poole projections, the NPA population projections were chosen for this report.

Population projections were not obtained from individual states because of inconsistencies among state projection techniques. Each state may use different assumptions (e.g., economic scenarios, fertility, and mortality) and methods in making their projections. For these reasons, NOAA chose to use a consistent set of population projections developed for all states.

How the Projections are Made. NPA used a three-step process to generate its population projections. First, national economic projections were made for employment and earnings using historical economic data from the BEA. Regional economic projections were then made for 183 Economic Areas (EAs) defined by the BEA. The EAs are aggregates of contiguous counties and represent cohesive economic regions of the U.S. National projections were allocated to the EAs and then to counties to determine the population projection for each county. County population projections were developed using area-specific ratios of employment to population. These ratios reflect the long-term structural differences among areas in age composition, employment rates, labor force participation, age structure of migration flows, and inter-area commuter flows (Terleckyj and Coleman, 1989).

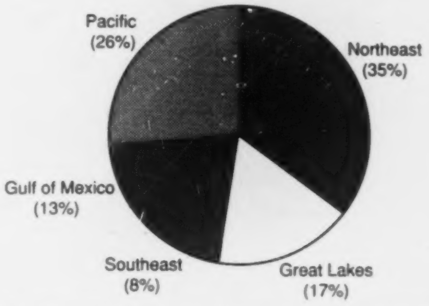
Explanation of the Data. All of the population data for years prior to 1990 are from the Bureau of the Census. Population data for 1990, 2000, and 2010 are NPA projections. Because the most recent county-level population estimates of the Bureau of the Census are for 1988, and are more valid than the NPA's 1990 projections, maps and charts shown in this report that examine changes over the next two decades are for the time period 1988-2010, and not 1990-2010. For the same reason, 1988 is used as the "base year" instead of 1990.

The population projections in this paper only address changes in total population. They do not account for the increased demand placed on coastal tourism or recreational resources by visitors from counties outside of the immediate coastal area. This demand may take the form of increased development of seasonal housing, construction of more hotels and motels, or large and more numerous recreational facilities.

National Overview

The Nation's coastal areas include some of the most rapidly growing and densely populated counties in the U.S. From 1960-2010, the coastal population will have grown from 80 million to more than 127 million people, an increase of almost 60 percent.

Figure 1. *Regional Distribution of the Nation's Coastal Population*



The Northeast and the Pacific regions have the largest coastal populations in the U.S. today. Together they account for about 28 percent of the entire U.S. population. Figure 1 shows the distribution, by region, of the Nation's coastal population.

The 451 coastal counties account for 20 percent of the Nation's total land area. However, if the land area of Alaska is excluded, the coastal county land area comprises only 11 percent of the remaining national total. Continued population growth in coastal areas portends increased crowding of this relatively

Figure 2. *Population Change, 1960-2010*

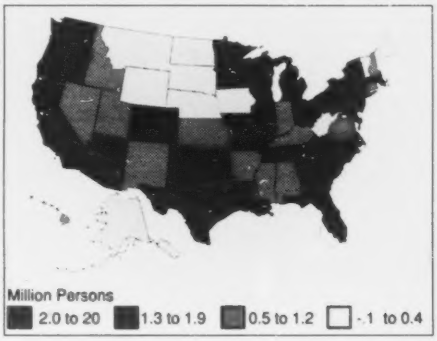


Table 1. *Leading Coastal States in Population Change, 1960-2010*

State	Absolute*	State	Percent
California	19.2	Florida	226
Texas	11.6	Alaska	208
Florida	11.2	New Hampshire	129
Georgia	3.5	California	122
Virginia	3.0	Texas	121

*Million persons

small, but densely populated, portion of the Nation. Coastal population will grow by about 15 percent over the next two decades.

Coastal vs. Non-coastal States. U.S. population during the 50-year period, 1960-2010, has, and is projected to, increase the most in coastal states (Figure 2). *Seventeen of the 20 states with the largest statewide population increases are coastal.* In Florida, which is defined as entirely coastal, the population will increase from five million in 1960 to more than 16 million by 2010, a 226 percent increase. By 2010, Florida's population will rank fourth in the Nation, up from tenth in 1960. California and Texas have and are projected to experience dramatic growth between 1960 and 2010. These states, which are projected to rank first and second respectively in total population in 2010, will increase by 30 million people (statewide) during this 50-year period. Table 1 shows the leading coastal states in absolute and percent population change between 1960 and 2010.

Coastal County Population Change. The decade of maximum coastal population growth during the study period (1960-2010) was the 1960s, when coastal population increased by more than 13 million persons, with California, Florida, and New York accounting for approximately 58 percent of the increase. Coastal growth slowed during the 1970s, but rebounded in the 1980s. An increase of more than 10 million persons is projected between 1980 and 1990. In the 1980s, California, Florida, and Texas will account for 73 percent of the growth in coastal areas. Coastal population growth will slow over the next two decades, but growth rates throughout the Nation will also decrease. Table 2 lists the change in coastal, non-coastal, and total U.S. populations between 1960 and 2010.

Eight coastal counties in California and Florida will be in the top 10 counties in absolute population change between 1988 and 2010. The Southern California counties of Los Angeles, Orange, and San Diego will grow by 2.6 million persons during this period. The Miami area (Dade, Broward, and Palm Beach counties) will also increase rapidly, with about 1.2 million additional persons projected by 2010. Only five percent of coastal counties will decline in population over the next 20 years. The largest declines will occur in the Northeast and Great Lakes regions. Figure 3 shows

Table 2. *U.S. Coastal and Non-coastal Population Change, 1960-2010*

Counties	1960	Percent Change 1960-1970	1970	Percent Change 1970-1980	1980	Percent Change 1980-1990	1990	Percent Change 1990-2000	2000	Percent Change 2000-2010	2010
Coastal	80*	17	93	9	101	11	112	8	120	6	127
Non-coastal	101	11	112	13	127	9	138	7	148	5	156
Total	181	14	205	11	228	10	249	7	268	6	283

*Million Persons

Figure 3. *Population Change in Coastal Counties, 1988-2010*

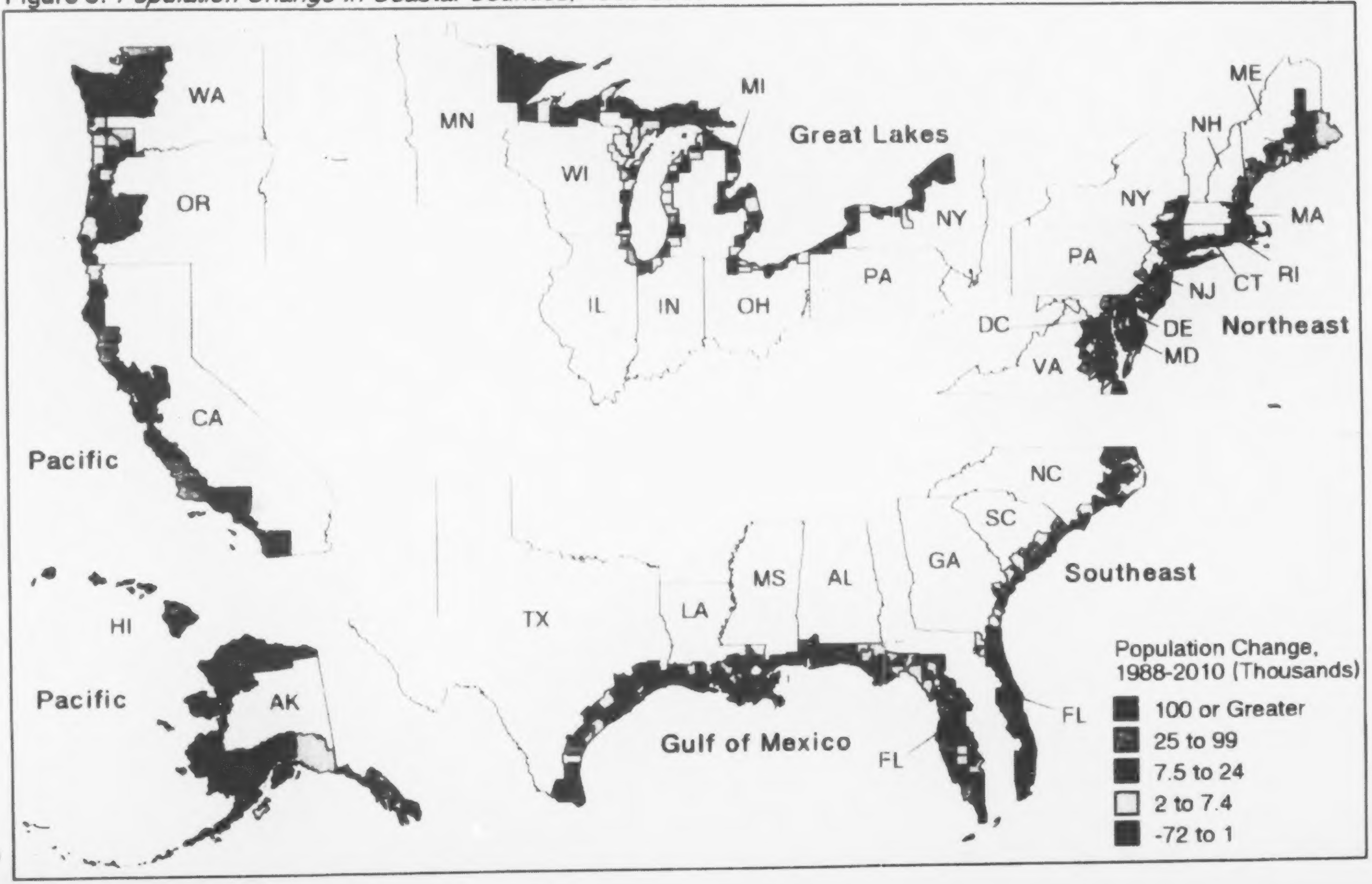
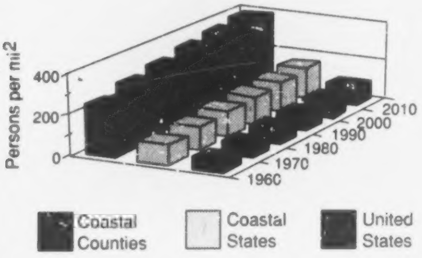

WA
OR
CA
Pacific
MN
WI
MI
Great Lakes
IL
IN
OH
PA
NY
ME
NH
NY
MA
PA
RI
CT
NJ
DC
DE
Northeast
VA
MD
NC
SC
GA
Southeast
MS
AL
LA
TX
HI
AK
Pacific
Gulf of Mexico
FL
FL
Population Change, 1988-2010 (Thousands)
100 or Greater
25 to 99
7.5 to 24
2 to 7.4
-72 to 1

Figure 4. *Population Density, 1960-2010*



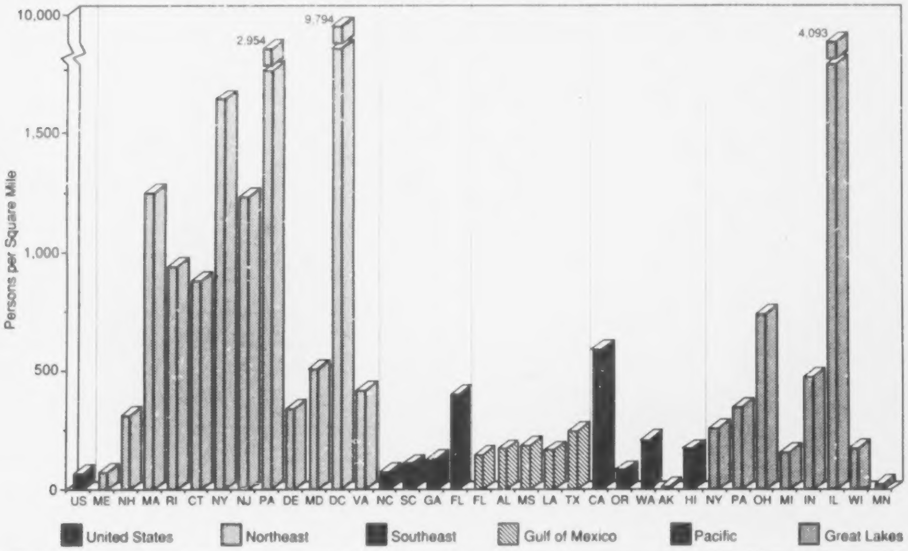
Note: Does not include Alaska.

the projected change in population between 1988 and 2010 in U.S. coastal counties.

Coastal County Population Density. Coastal areas include some of the most densely populated counties in the Nation. Population density in coastal counties (excluding Alaska, since its huge coastal area dilutes the national picture) has increased dramatically since 1960 (Figure 4). While the population density in the U.S. was 61 persons per square mile in 1960, population density in coastal states was 100 persons per square mile, and 248 persons per square mile in coastal counties. By 1988, population density in coastal counties reached 341 persons per square mile, more than four times the U.S. average. Population density in coastal areas is expected to increase as more people continue to move into this limited space. About 68 percent of all coastal counties will have a population density increase of more than 10 percent between 1988 and 2010.

In 1988, 101 counties had a population density greater than 500 persons per square mile. The most densely populated counties, those in which population densities exceed 10,000 persons per square mile, include and/or surround the cities of New York, San Francisco, Boston, and Philadelphia. The largest percent change in population density over the next two decades is

Figure 5. *United States and Coastal Population Density, 1988*



expected in Florida, primarily along the state's Gulf coast. Declines in population density during this same period are projected in 23 counties. The largest declines are expected in the major urban centers of the Great Lakes and Northeast.

The most densely populated portion of the Nation's coastal zone is the Northeast, where four states and the District of Columbia have densities exceeding 1,000 persons per square mile. The Great Lakes region is the second most densely populated area, with Illinois and Ohio having the highest population concentrations in this region. The Southeast region follows, because of the high population density of the Miami metropolitan area. The least densely populated region is the Pacific, largely a result of the diluting effect of Alaska's vast stretches of uninhabited coastline. Otherwise, the Gulf of Mexico has the lowest population density. Figure 5 shows the distribution of coastal county population density by state.

Coastal County Population by Shoreline Mile. Coastal areas are often valued for their aesthetic appeal and are increasingly attractive for commercial and residential development. Waterfront sites are highly prized for housing. These same sites are also sought for a wide variety of recreational activities and tourist attractions. However, the appeal and attractiveness of these areas are being diminished by the pressures of population growth and the requirements of development (New York Water Pollution Control Association, Inc., 1989).

Population per shoreline mile serves as one indicator of "environmental stress" along the Nation's coastline. These figures were developed by dividing the coastal population of each state by tidal shoreline mileage (NOAA, 1975). Coastal areas had a national average of 1,177 persons per shoreline mile in 1988, and a projected ratio of 1,358 in 2010. The coastal states with the highest population-to-shoreline ratios (due primarily to their relatively small shorelines) include: Illinois, 91,740; eastern Pennsylvania, 30,871; Indiana, 15,951; and the District of Columbia, 15,049.

Northeast

The Northeast is the most populated of the five regions, accounting for more than one-third of the Nation's coastal population. *It contains 18 of the 25 most densely populated counties in the entire U.S.* In 1988, the 134 coastal counties in this region, stretching from the northern coast of Maine to the Tidewater region of Virginia, were home to more than 39 million people, about 16 percent of the Nation's total population. The Northeast coastal population is projected to increase by 10 percent over the next two decades, to almost 43 million in 2010. This increase is almost equivalent to the combined current populations of Connecticut and Rhode Island. The major population centers of the region include New York City, Philadelphia, Baltimore, Washington, and Boston.

Population Trends. The coastal population in the Northeast will increase by 30 percent between 1960 and 2010. As a region, the greatest change in population occurred during the 1960s, when the Northeast coastal population increased by 13 percent. The Northeast region will experience lower than aver-

Table 3. *Northeast Population, 1960-2010*

STATE	Land Area (Sq. Mi.)	POPULATION											
		1960		1970		1980		1990		2000		2010	
		Absolute*	Density**	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density
MAINE	30,995	969	31	994	32	1,125	36	1,220	39	1,313	42	1,387	45
Coastal	12,128	655	54	686	57	795	66	879	72	953	79	1,010	83
Coastal Percent	**(39%)**	**(68%)**		**(69%)**		**(71%)**		**(72%)**		**(73%)**		**(73%)**	
NEW HAMPSHIRE	8,993	607	67	730	82	921	102	1,126	125	1,287	143	1,392	155
Coastal	1,069	159	149	209	196	276	258	353	331	414	388	452	423
Coastal Percent	**(12%)**	**(26%)**		**(28%)**		**(30%)**		**(31%)**		**(32%)**		**(32%)**	
MASSACHUSETTS	7,824	5,149	658	5,689	727	5,737	733	5,978	764	6,344	811	6,687	855
Coastal	3,535	3,836	1,085	4,260	1,205	4,299	1,216	4,496	1,272	4,784	1,353	5,049	1,428
Coastal Percent	**(45%)**	**(75%)**		**(75%)**		**(75%)**		**(75%)**		**(75%)**		**(75%)**	
RHODE ISLAND	1,055	859	815	950	901	947	898	1,002	950	1,055	1,001	1,106	1,048
Coastal	1,055	859	815	950	901	947	898	1,002	950	1,055	1,001	1,106	1,048
Coastal Percent	**(100%)**	**(100%)**		**(100%)**		**(100%)**		**(100%)**		**(100%)**		**(100%)**	
CONNECTICUT	4,872	2,535	520	3,032	622	3,108	638	3,262	670	3,443	707	3,623	744
Coastal	2,284	1,589	695	1,883	825	1,936	848	2,025	887	2,133	934	2,244	982
Coastal Percent	**(47%)**	**(63%)**		**(62%)**		**(62%)**		**(62%)**		**(62%)**		**(62%)**	
NEW YORK	47,377	16,782	354	18,241	385	17,558	371	17,771	375	18,220	385	18,976	401
Coastal	7,570	11,699	1,545	12,742	1,683	12,082	1,596	12,330	1,629	12,638	1,669	13,191	1,743
Coastal Percent	**(16%)**	**(70%)**		**(70%)**		**(69%)**		**(69%)**		**(69%)**		**(70%)**	
NEW JERSEY	7,468	6,067	812	7,171	960	7,365	986	7,686	1,029	8,027	1,075	8,433	1,129
Coastal	5,686	5,639	992	6,566	1,155	6,669	1,173	6,934	1,219	7,21[illegible]	1,269	7,567	1,331
Coastal Percent	**(76%)**	**(93%)**		**(92%)**		**(91%)**		**(90%)**		**(90%)**		**(90%)**	
PENNSYLVANIA	44,888	11,319	252	11,801	263	11,864	264	11,944	266	12,289	274	12,805	285
Coastal	930	2,864	3,080	2,970	3,194	2,722	2,927	2,717	2,921	2,769	2,978	2,881	3,098
Coastal Percent	**(2%)**	**(25%)**		**(25%)**		**(23%)**		**(23%)**		**(23%)**		**(23%)**	
DELAWARE	1,932	446	231	548	284	594	307	654	338	691	357	728	377
Coastal	1,932	446	231	548	284	594	307	654	338	691	357	728	377
Coastal Percent	**(100%)**	**(100%)**		**(100%)**		**(100%)**		**(100%)**		**(100%)**		**(100%)**	
MARYLAND	9,837	3,101	315	3,924	399	4,217	429	4,631	471	4,943	502	5,239	533
Coastal	6,444	2,403	373	2,975	462	3,088	479	3,269	507	3,435	533	3,620	562
Coastal Percent	**(66%)**	**(78%)**		**(76%)**		**(73%)**		**(71%)**		**(70%)**		**(69%)**	
DIST. OF COLUMBIA	63	764	12,126	757	12,011	638	10,127	621	9,864	636	10,091	665	10,550
Coastal	63	764	12,126	757	12,011	638	10,127	621	9,864	636	10,091	665	10,550
Coastal Percent	**(100%)**	**(100%)**		**(100%)**		**(100%)**		**(100%)**		**(100%)**		**(100%)**	
VIRGINIA	39,704	3,967	100	4,651	117	5,347	135	6,088	153	6,591	166	6,988	176
Coastal	8,914	2,203	247	2,776	311	3,174	356	3,772	423	4,133	464	4,409	495
Coastal Percent	**(22%)**	**(56%)**		**(60%)**		**(59%)**		**(62%)**		**(63%)**		**(63%)**	
TOTAL	205,008	52,566	256	58,496	285	59,421	290	61,984	302	64,838	316	68,028	332
Coastal	51,610	33,116	642	37,323	723	37,221	721	39,053	757	40,855	792	42,922	832
Coastal Percent	**(25%)**	**(63%)**		**(64%)**		**(63%)**		**(63%)**		**(63%)**		**(63%)**	

*Thousand persons **Persons per square mile

age growth over the next two decades when compared to the entire U.S. Given the relatively degraded environmental quality conditions that already exist in this region, any growth is likely to make these problems more severe. Figure 6 shows the percent change in population in Northeast coastal counties between 1988 and 2010.

As shown in Table 3, all but two of the states, Pennsylvania and New Hampshire, in the Northeast region have most of their population in coastal counties. About 63 percent of the region's population resides in the narrow band of coastal counties that border the ocean and estuaries in these states. This relatively high proportion of coastal versus non-coastal population is even more important when one considers that coastal counties account for only one-fourth of the total land area in the region. While almost four million people are expected to be added to the region's coastal population by 2010, the ratio of coastal to non-coastal population should remain roughly the same.

Population Density. Because of the large population and small amount of land area in these coastal counties, this region is the most densely populated in the U.S., with more than 750 persons per square mile. The population density should rise to over 830 persons per square mile by 2010. At that point, the coastal population density will be more than five times that of the region's non-

Figure 6. *Population Change in Northeast Coastal Counties, 1988 - 2010*

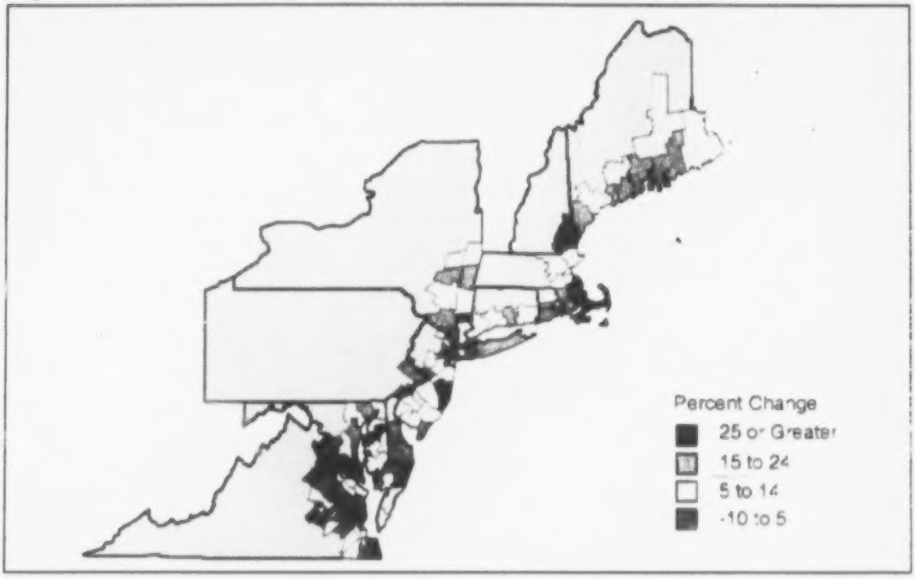

Percent Change
25 or Greater
15 to 24
5 to 14
-10 to 5

Figure 7. *Population Density in Northeast Coastal Counties, 2010*

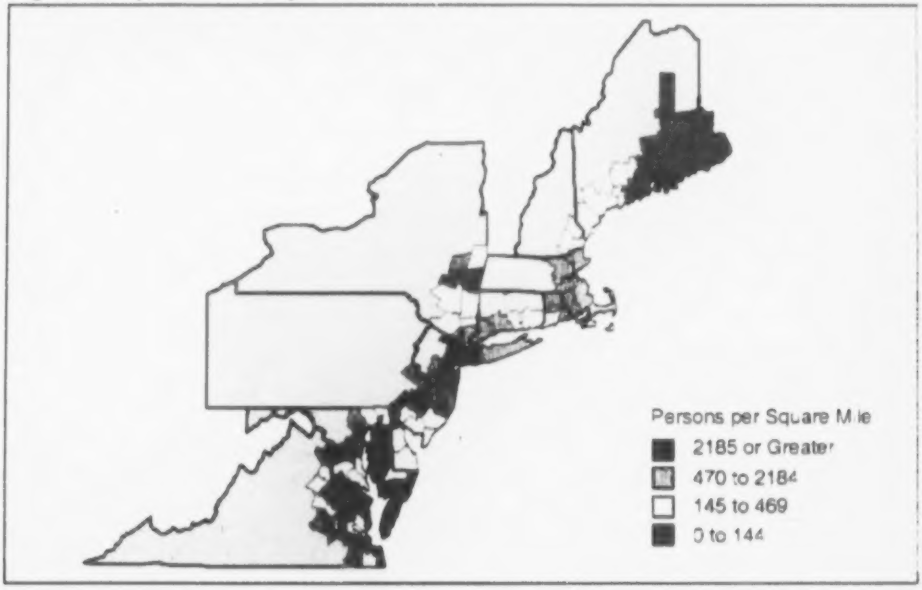
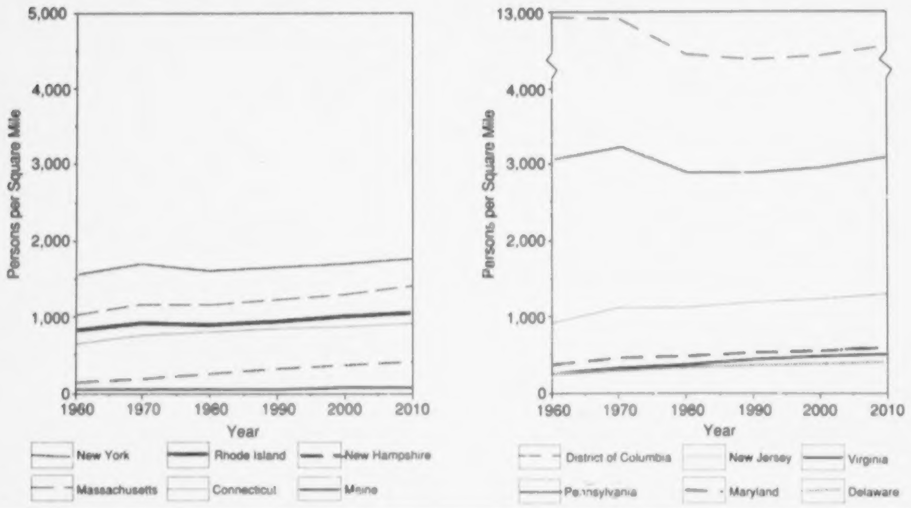

Persons per Square Mile
2185 or Greater
470 to 2184
145 to 469
0 to 144

Figure 8. *Northeast Coastal Population Density, 1960-2010*



(a) Maine-New York *(b) New Jersey-Virginia*

coastal counties. Figure 7 shows the population density of coastal counties in the Northeast region in 2010.

Figures 8a and 8b show the trend in population density for the coastal portions of states in the Northeast. The overall trend for the region is one of slow growth, with each state's ranking remaining constant, except for New Hampshire, which is projected to surpass Delaware by 2010. Pennsylvania has a higher density than other states in the region, excluding the District of Columbia, because its counties are almost exclusively urban. *Six of the Nation's seven leading states in coastal county population density are located in the Northeast.*

Population by Shoreline Mile. Table 4 lists the coastal population per shoreline mile for each of the Northeast states. The high value for Pennsylvania is the result of a major population center (Philadelphia) comprising a large portion of the state's coastal zone. In other Northeast states with large coastal population centers, such as Boston, New York City, and Baltimore, there is a greater length of shoreline reaching less populated portions of the state, consequently lowering the overall population per shoreline mile.

"Hot Spots" of Growth. Table 5 lists the top 15 coastal counties in the region for three categories: the counties expected to increase by the most people; the counties projected to increase at the fastest rate; and the counties projected to have the highest population density. The counties with the largest projected increases in population are primarily suburbs of the large cities in the region. Suffolk County, NY, for example, is located on the eastern end of Long Island, and will grow largely due to its proximity to New York City. Queens County, NY, is one of the boroughs of New York City.

Table 4. *Northeast Coastal Population per Shoreline Mile*

	Year		
State	1960	1988	2010
Maine	188	250	290
New Hampshire	1,212	2,553	3,453
Massachusetts	2,525	2,907	3,324
Rhode Island	2,238	2,585	2,881
Connecticut	2,570	3,235	3,631
New York	6,324	6,738	7,130
New Jersey	3,147	3,898	4,223
Pennsylvania	32,182	30,871	32,375
Delaware	1,171	1,733	1,910
Maryland	753	1,027	1,135
District of Columbia	18,633	15,049	16,212
Virginia	665	1,133	1,330
Northeast	1,973	2,330	2,557

Fairfax County, VA, is located across the Potomac River from Washington, DC. Middlesex County, MA, is west and north of Boston.

A slightly different pattern emerges for counties with large increases in their rate of growth. These counties are located at the edges of the existing areas of urban influence. Instead of being directly adjacent to a major city, they are usually one county beyond the recognized suburban area. This "suburban sprawl" from the central city outward to the surrounding counties has been occurring throughout the U.S., especially since the end of World War II. The percent change map (Figure 6) shows the pattern of more rapid growth at the fringes of current metropolitan regions.

A second pattern emerges due to the influence of an aging population. At least four of the counties with rapid projected growth currently have a large elderly population. These counties (Virginia Beach, VA; Worcester, MD; Ocean, NJ; and Barnstable, MA) are popular retirement and resort areas for people who want to settle on or visit the Atlantic coast.

The Northeast is the most densely populated region in the entire U.S. The 15 northeastern counties listed in Table 5 for population density are also nationwide leaders in population density. Except for San Francisco County, CA, *nine of the 10 most densely populated counties in the U.S. in 1988 were in the Northeast.* In 2010, 56 of the region's counties, or 42 percent, are projected to have a population density larger than 800 persons per square mile, or 10 times the projected national average.

Table 5. *Northeast Leading Counties in Population Change*

County	Population Change, 1988-2010 (1,000 Persons)	County	Percent Population Change, 1988-2010	County	Population per Square Mile, 2010 (100 Persons)
Suffolk, NY	225	Spotsylvania, VA	49	New York, NY	71
Fairfax, VA	210	Barnstable, MA	46	Kings, NY	33
Middlesex, MA	144	Charles, MD	43	Bronx, NY	27
Ocean, NJ	124	Dukes, MA	43	Queens, NY	19
Queens, NY	118	Calvert, MD	42	Suffolk, MA	12
Plymouth, MA	114	Falls Church, VA	40	Philadelphia, PA	12
Virginia Beach, VA	105	Rockingham, NH	39	Hudson, NJ	12
Anne Arundel, MD	93	Fredericksburg, VA	34	District of Columbia	11
Rockingham, NH	92	Nantucket, MA	33	Baltimore City, MD	9
Fairfield, CT	91	Gloucester, VA	33	Richmond, NY	8
New Haven, CT	89	Prince William, VA	33	Alexandria, VA	8
Bristol, MA	88	Stafford, VA	33	Essex, NJ	7
Barnstable, MA	86	King George, VA	31	Falls Church, VA	7
Bucks, PA	85	Ocean, NJ	30	Arlington, VA	7
Essex, MA	82	Chesterfield, VA	30	Norfolk, VA	6

Table 6. *Great Lakes Population, 1960-2010*

STATE	Land Area (Sq. Mi.)	POPULATION 1960 Absolute*	1960 Density**	1970 Absolute	1970 Density	1980 Absolute	1980 Density	1990 Absolute	1990 Density	2000 Absolute	2000 Density	2010 Absolute	2010 Density
NEW YORK	47.377	16.782	354	18.241	385	17.558	371	17.771	375	18.220	385	18.976	401
Coastal	9.945	2.500	251	2.704	272	2.611	263	2.551	257	2.596	261	2.685	270
Coastal Percent	**(21%)**	**(15%)**		**(15%)**		**(15%)**		**(14%)**		**(14%)**		**(14%)**	
PENNSYLVANIA	44.888	11.319	252	11.801	263	11.864	264	11.944	266	12.289	274	12.805	285
Coastal	804	251	312	264	328	280	348	279	347	285	354	295	367
Coastal Percent	**(2%)**	**(2%)**		**(2%)**		**(2%)**		**(2%)**		**(2%)**		**(2%)**	
OHIO	41.004	9.706	237	10.657	260	10.798	263	10.761	262	11.002	268	11.411	278
Coastal	3.774	2.796	741	3.020	800	2.852	756	2.736	725	2.733	724	2.810	745
Coastal Percent	**(9%)**	**(29%)**		**(28%)**		**(26%)**		**(25%)**		**(25%)**		**(25%)**	
MICHIGAN	56.954	7.823	137	8.882	156	9.262	163	9.216	162	9.505	167	9.865	173
Coastal	31.477	4.694	149	5.099	162	5.034	160	4.832	154	4.897	156	5.054	161
Coastal Percent	**(55%)**	**(60%)**		**(57%)**		**(54%)**		**(52%)**		**(52%)**		**(51%)**	
INDIANA	35.932	4.662	130	5.195	145	5.490	153	5.550	154	5.711	159	5.925	165
Coastal	1.519	669	440	739	486	751	495	713	469	722	475	749	493
Coastal Percent	**(4%)**	**(14%)**		**(14%)**		**(14%)**		**(13%)**		**(13%)**		**(13%)**	
ILLINOIS	55.645	10.081	181	11.110	200	11.427	205	11.560	208	11.846	213	12.331	222
Coastal	1.412	5.423	3.841	5.876	4.162	5.694	4.033	5.704	4.040	5.746	4.070	5.953	4.216
Coastal Percent	**(3%)**	**(54%)**		**(53%)**		**(50%)**		**(49%)**		**(49%)**		**(48%)**	
WISCONSIN	54.426	3.952	73	4.418	81	4.706	86	4.886	90	5.148	95	5.378	99
Coastal	10.515	1.785	170	1.915	182	1.982	179	1.864	177	1.915	182	1.986	189
Coastal Percent	**(19%)**	**(45%)**		**(43%)**		**(40%)**		**(38%)**		**(37%)**		**(37%)**	
MINNESOTA	79.548	3.414	43	3.806	48	4.076	51	4.363	55	4.690	59	4.950	62
Coastal	9.590	249	26	237	25	239	25	212	22	216	23	224	23
Coastal Percent	**(12%)**	**(7%)**		**(6%)**		**(6%)**		**(5%)**		**(5%)**		**(5%)**	
TOTAL	415.774	67.741	163	74.111	178	75.181	181	76.052	183	78.409	189	81.641	196
Coastal	69.036	18.367	266	19.855	288	19.344	280	18.892	274	19.109	277	19.755	286
Coastal Percent	**(17%)**	**(27%)**		**(27%)**		**(26%)**		**(25%)**		**(24%)**		**(24%)**	

*Thousand persons **Persons per square mile

Great Lakes

The Great Lakes region, the third most populous coastal region, contains 85 of the Nation's coastal counties. The region includes the coastal portions of eight states surrounding the five Great Lakes along the U.S.-Canada border. These lakes, in order of greatest surface water area, are Lake Superior, Lake Huron, Lake Michigan, Lake Erie, and Lake Ontario. The coastal counties in this region contain about 19 million people, or roughly 17 percent of the Nation's coastal population. The region's share of the U.S. coastal population is expected to drop over the next two decades because of relatively slow growth in most of its counties. *Between 1980 and 1986, eight of the Nation's 20 leading counties in population loss were located in this region.*

Population Trends. The Great Lakes coastal population is expected to increase by eight percent between 1960 and 2010. The decade of maximum coastal population growth was the 1960s. However, population declined during the 1970s and 1980s and offset the earlier increase. Although the region is not projected to experience rapid growth over the next two decades, it will remain an important center for industry and commerce. The region contains four of the Nation's 20 most populous counties.

Unlike the Northeast, the Great Lakes region has a relatively small proportion (25 percent) of its population in coastal counties. With only 17 percent of the region's land area in coastal counties, the population density of 275 persons per square mile is much lower than the density in the Northeast. It is, however, much higher than the overall U.S. figure of about 70 persons per square mile.

Figure 9. *Population Change in Great Lakes Coastal Counties, 1988 - 2010*

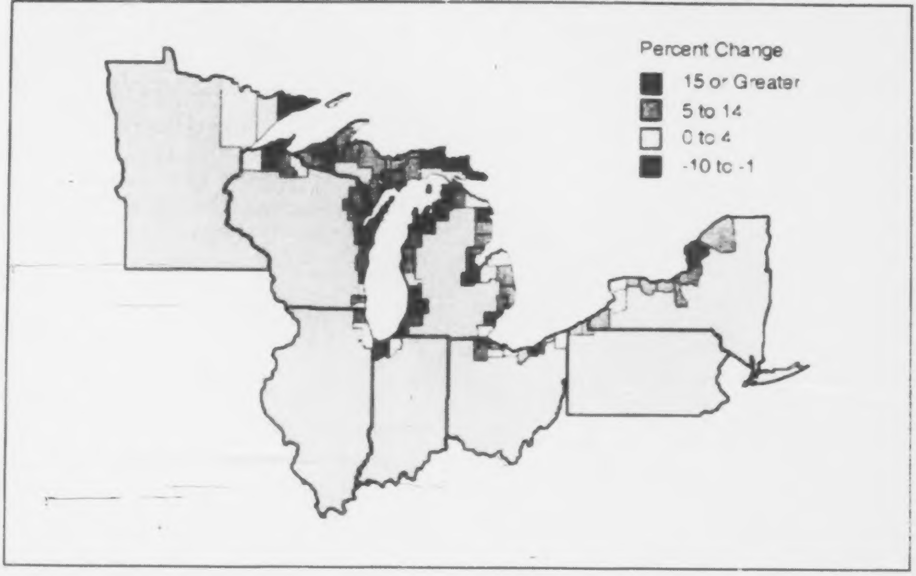

Percent Change
15 or Greater
5 to 14
0 to 4
-10 to -1

Figure 10. *Population Density in Great Lakes Coastal Counties, 2010*

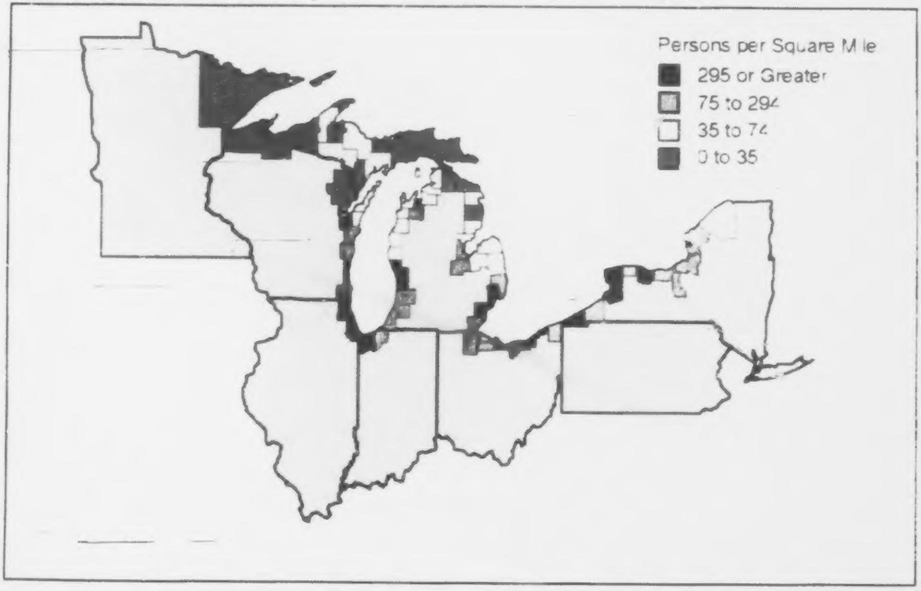

Persons per Square Mile
295 or Greater
75 to 294
35 to 74
0 to 35

Figure 11. *Great Lakes Coastal Population Density, 1960-2010*

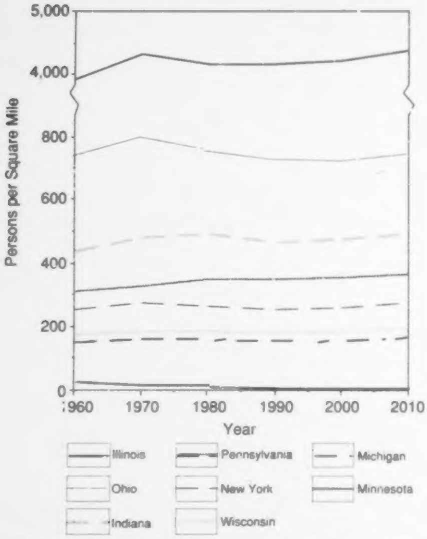


Table 6 summarizes the change in population and population density for each coastal state between 1960 and 2010.

Figure 9 shows the percent change in population between 1988 and 2010. Most of the counties expected to experience rapid growth in the region have relatively small populations. Unlike the Northeast, most of these higher growth counties are not found near metropolitan areas. The region has 12 coastal counties expected to lose population between 1988 and 2010, more than any other coastal region in the Nation.

Population Density. The population densities of the coastal portions of these states through time are shown in Figure 11. Because both Cook and Lake counties are so highly developed, the coastal population density of Illinois is much higher than any other state in the region and, excluding the District of Columbia, the Nation.

Table 7. *Great Lakes Coastal Population per Shoreline Mile*

	Year		
State	1960	1988	2010
New York	6,127	6,273	6,581
Pennsylvania	4,915	5,431	5,785
Ohio	8,963	8,892	9,006
Michigan	1,523	1,579	1,639
Indiana	14,859	15,951	16,646
Illinois	86,085	91,740	94,485
Wisconsin	2,176	2,285	2,422
Minnesota	1,316	1,135	1,186
Great Lakes	3,695	3,835	3,974

Figure 10 shows the population density for the region in 2010. The counties containing the major metropolitan areas in the region (Chicago, Detroit, Cleveland, Milwaukee, and Buffalo) appear in red. In general, population densities are higher along the southern shores of Lakes Michigan, Huron, and Erie.

Population by Shoreline Mile. The coastal population per shoreline mile (Table 7) confirms the high degree of development of the two coastal counties of Illinois. Its population of over 91,000 persons per mile of shoreline is the highest in the Nation. The shoreline mile population of Indiana is also high, 15,951, making it the fourth highest in the U.S. *The regional ratio of 3,835 persons per shoreline mile makes the Great Lakes the highest of the five coastal regions.*

"Hot Spots" of Growth. The slow growth trend expected for this region is evident after comparing the leading growth counties in this region to those in the four other coastal regions. The absolute and percent population change growth figures in Table 8 are lower than the leading counties in the other regions. Most of the counties with large projected population increases between

Table 8. *Great Lakes Leading Counties in Population Change*

County	Population Change, 1988-2010 (100 Persons)	County	Percent Population Change, 1988-2010	County	Population per Square Mile, 2010
Cook, IL	992	Porter, IN	26	Cook, IL	5,620
Macomb, MI	765	Cook, MN	23	Milwaukee, WI	3,960
Lake, IL	737	Leelanau, MI	21	Wayne, MI	3,397
Monroe, NY	566	Grand Traverse, MI	20	Cuyahoga, OH	3,073
Porter, IN	329	Bayfield, WI	19	Macomb, MI	1,625
Ottawa, MI	299	Benzie, MI	18	Lucas, OH	1,361
Brown, WI	255	Door, WI	18	Lake, IL	1,253
Milwaukee, WI	242	Ozaukee, WI	17	Monroe, NY	1,142
Erie, PA	180	Ottawa, MI	17	Lake, OH	998
Lorain, OH	175	Antrim, MI	17	Lake, IN	961
Lake, OH	158	Emmet, MI	16	Erie, NY	927
St. Clair, MI	151	Allegan, MI	16	Lorain, OH	582
Allegan, MI	143	Lake, IL	15	Racine, WI	554
Oswego, NY	136	Houghton, MI	15	Kenosha, WI	458
Grand Traverse, MI	129	Alcona, MI	15	Niagara, NY	427

1988 and 2010 contain, or are near, major cities. Some of these same counties experienced significant declines in population between 1980 and 1988.

The counties expected to grow at the fastest rate are found almost exclusively on the shores of Lakes Michigan and Superior. Porter County, IN, is in the eastern half of the Gary-Hammond metropolitan area. It is expected to experience continued rapid growth, even though the metropolitan area as a whole has been losing population over the last decade. This pattern also holds true for Ozaukee County, WI, part of the Milwaukee-Racine metropolitan area.

The list of high-density counties for 2010 is not very different from a list that would be compiled today. High-density counties are found in every Great Lakes state except Minnesota.

Southeast

The Southeast has the smallest population of the five regions shown, accounting for only eight percent of the U.S. coastal population. In 1988, the 56 counties in this region were home to more than nine million persons. *Four out of five people living in the coastal Southeast were located in eastern Florida.* The Southeast coastal population is projected to increase by 27 percent over the next two decades, to 11 million persons in 2010. The major population centers of the region include Miami, Jacksonville, Savannah, and Charleston.

Population Trends. The coastal population of the Southeast region is projected to increase by 181 percent (the highest of the five regions) between 1960 and 2010. The largest growth occurred between 1970 and 1980, when the Southeast coastal population increased by 36 percent. Table 9 summarizes the change in population and population density for each coastal state between 1960 and 2010.

Eastern Florida has and will dominate population trends in this region. This area has experienced extremely rapid growth; its population increased by 152 percent between 1960 and 1988. Its

Table 9. *Southeast Population, 1960-2010*

STATE	Land Area (Sq. Mi.)	POPULATION											
		1960		1970		1980		1990		2000		2010	
		Absolute*	Density**	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density
NORTH CAROLINA	48,843	4,556	93	5,084	104	5,882	120	6,597	135	7,066	145	7,400	152
Coastal	9,378	474	50	510	54	596	64	699	75	752	80	789	84
Coastal Percent	**(19%)**	**(10%)**		**(10%)**		**(10%)**		**(11%)**		**(11%)**		**(11%)**	
SOUTH CAROLINA	30,203	2,383	79	2,591	86	3,122	103	3,534	117	3,812	126	4,010	133
Coastal	7,006	507	65	565	72	724	93	889	114	984	126	1,049	134
Coastal Percent	**(23%)**	**(21%)**		**(22%)**		**(23%)**		**(25%)**		**(26%)**		**(26%)**	
GEORGIA	58,056	3,943	68	4,588	79	5,463	94	6,458	111	7,053	121	7,472	129
Coastal	2,887	267	93	281	97	326	113	374	130	399	138	419	145
Coastal Percent	**(5%)**	**(7%)**		**(6%)**		**(6%)**		**(6%)**		**(6%)**		**(6%)**	
FLORIDA	54,153	4,952	91	6,791	125	9,746	180	12,837	237	14,811	273	16,143	298
Coastal	17,210	2,744	159	3,901	227	5,513	320	7,169	417	8,230	478	8,957	520
Coastal Percent	**(32%)**	**(55%)**		**(57%)**		**(57%)**		**(56%)**		**(56%)**		**(55%)**	
TOTAL	191,255	15,833	83	19,054	100	24,213	127	29,425	154	32,742	171	35,025	183
Coastal	37,281	3,992	107	5,257	141	7,159	192	9,131	245	10,366	278	11,214	301
Coastal Percent	**(19%)**	**(25%)**		**(28%)**		**(30%)**		**(31%)**		**(32%)**		**(32%)**	

*Thousand persons **Persons per square mile

population is projected to increase by 226 percent for the entire 50-year period. Population increases in eastern Florida have been, and are projected to be, the largest in the counties containing, or adjacent to Jacksonville, Miami, Fort Lauderdale, West Palm Beach, and Orlando. Rapid growth also is projected to occur around Savannah and Charleston.

Although coastal counties comprise only 19 percent of the land area in the four Southeastern states, they contain more than 31 percent of the population in these states. Between 1988 and 2010, almost one-third (16 of 56) of the coastal counties are projected to have population increases of 35-75 percent. Figures 12 and 13 show, by coastal county, the percent change in population between 1988 and 2010, and the projected population density in 2010.

Population Density. Coastal population densities across the region in 1988 ranged from a low of 73 persons per square mile in North Carolina to a high of 402 persons per square mile in Florida. The average for the region was 237 persons per square mile, well above the U.S. average of 70 persons per square mile. Population density in the Southeast is expected to increase to an average of 301 persons per square mile by 2010. Figure 14 shows that Florida will continue to lead the region in population density, with an increase from 159 persons per square mile in 1960 to slightly more than 520 persons per square mile by 2010, a change of about 227 percent.

Seasonal variations in population density occur even in such low-density areas as coastal North Carolina. Southeast coastal areas attract visitors from major metropolitan centers in the southern U.S., bringing increased seasonal environmental stress in the form of housing, hotels and motels, recreation, and supporting infrastructure.

Population by Shoreline Mile. Table 10 shows that the population-to-shoreline mile ratio in the Southeast will almost triple in size between 1960 and 2010. Florida's ratio of 2,075 raises the regional average because it is much higher than any other Southeastern state. The remaining states are more rural and have a greater number of shoreline miles because of large estuar-

Figure 12. *Population Change in Southeast Coastal Counties, 1988-2010*

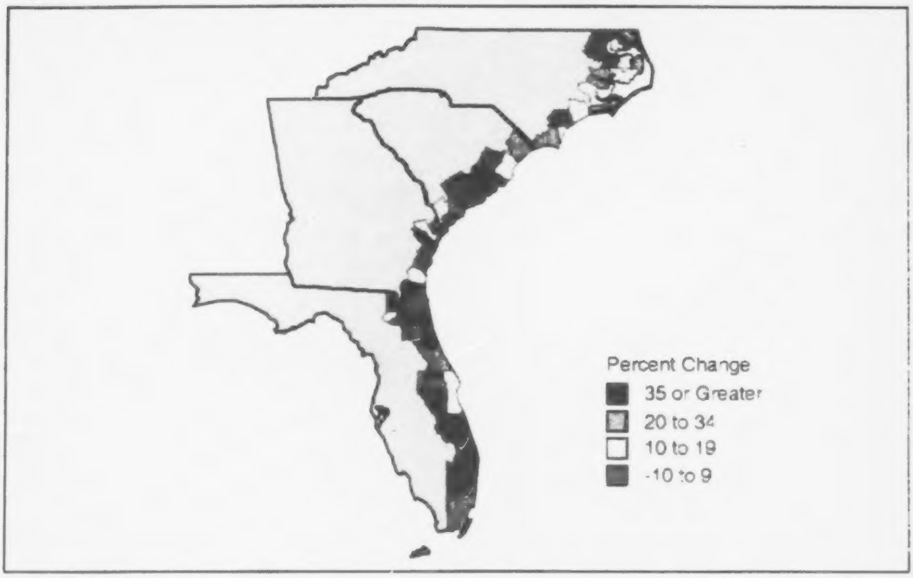

Percent Change
35 or Greater
20 to 34
10 to 19
-10 to 9

Figure 13. *Population Density in Southeast Coastal Counties, 2010*

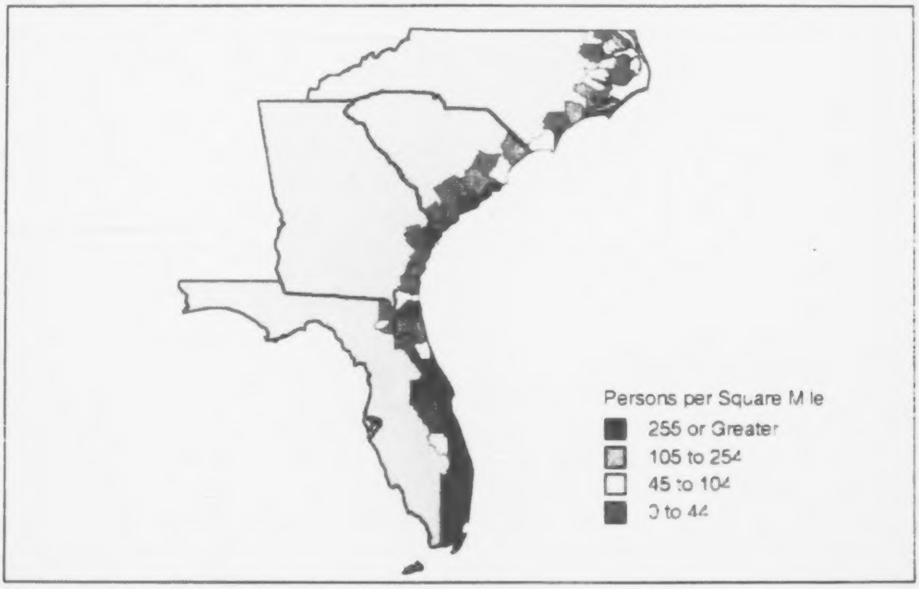

Persons per Square Mile
255 or Greater
105 to 254
45 to 104
0 to 44

Figure 14. *Southeast Coastal Population Density, 1960-2010*

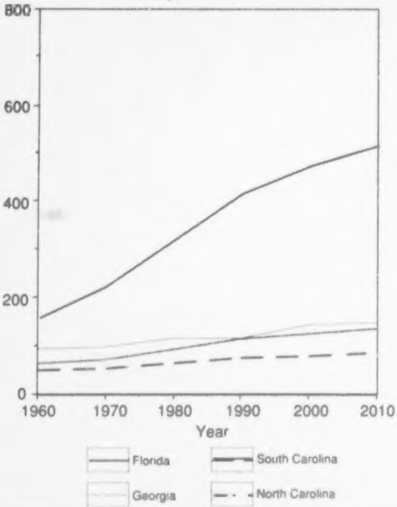


Table 10. *Southeast Coastal Population per Shoreline Mile*

	Year		
State	1960	1988	2010
North Carolina	140	202	234
South Carolina	176	303	365
Georgia	114	158	179
Florida	824	2,075	2,689
Southeast	335	741	940

ine and barrier island systems. Many of these natural systems, especially throughout the Carolinas, are contained within a large network of state and national parks, which limit coastal development opportunities.

"Hot Spots" of Growth. As shown in Table 11, eastern Florida dominates all three categories: the counties expected to increase by the most people; the counties projected to increase at the fastest rate; and the counties projected to have the highest population density. This is a reflection of the state's large and rapidly growing population. Partly because they already contain large urban areas (Fort Lauderdale, Miami, Hollywood, Hialeah, and West Palm Beach), Broward, Dade, and Palm Beach counties in Florida are projected to be the three leading counties in population change between 1988 and 2010. Berkeley and Dorchester counties in South Carolina also appear on the list because of their proximity to Charleston.

Coastal counties projected to increase at the fastest rate are led by Osceola, Martin, and Flagler counties in Florida. These are "retirement-oriented" counties, but will also grow as a result of their

Table 11. *Southeast Leading Counties in Population Change*

County	Population Change, 1988-2010 (1,000 Persons)	County	Percent Population Change, 1988-2010	County	Population per Square Mile, 2010
Broward, FL	436	Osceola, FL	72	Seminole, FL	1,391
Dade, FL	366	Martin, FL	61	Broward, FL	1,340
Palm Beach, FL	362	Flagler, FL	59	Dade, FL	1,115
Seminole, FL	145	Seminole, FL	54	Duval, FL	915
Orange, FL	131	Indian River, FL	50	Orange, FL	816
Volusia, FL	103	Berkeley, SC	50	New Hanover, NC	704
Brevard, FL	77	St. Johns, FL	48	Palm Beach, FL	592
Osceola, FL	65	St. Lucie, FL	47	Chatham, GA	546
St. Lucie, FL	64	Okeechobee, FL	47	Brevard, FL	468
Berkeley, SC	63	Clay, FL	46	Volusia, FL	405
Martin, FL	59	Dorchester, SC	45	St. Lucie, FL	345
Clay, FL	46	Palm Beach, FL	44	Charleston, SC	323
Indian River, FL	43	Liberty, GA	42	Martin, FL	279
St. Johns, FL	38	Broward, FL	37	Indian River, FL	262
Dorchester, SC	37	Baker, FL	36	Clay, FL	247

proximity to large urban centers. The only Georgia county on the leading growth list, Liberty, is projected to increase by 42 percent over the next two decades. This is due primarily to its proximity to Savannah, as well as to the effect of Fort Stewart, a large military reservation located almost entirely within the county.

Seminole, Broward, and Dade counties in Florida are projected to be the most densely populated counties in the Southeast by 2010. Broward and Dade counties have large land areas, but contain the entire Miami-Fort Lauderdale metropolitan area. Seminole County has a high density because of its small land area and proximity to Orlando. New Hanover County, NC, also has a small land area and contains numerous beach resorts as well as the city of Wilmington. Chatham County, GA, contains Savannah, the fifth largest city in the region.

Gulf of Mexico

The Gulf of Mexico ranks fourth in total population among the five coastal regions, accounting for 13 percent of the total U.S. coastal population. In 1988, the 99 counties in this region were home to more than 14 million persons. The Gulf coastal population is projected to increase by 22 percent, to almost 18 million by 2010. The major population centers in the Gulf region include Houston, New Orleans, Tampa, and St. Petersburg.

Population Trends. The coastal population in the Gulf of Mexico is projected to increase by 144 percent between 1960 and 2010, the second highest of the five regions. As a region, the greatest change in population occurred between 1970 and 1980, when the Gulf coastal population increased by 33 percent. Western Florida has been and will continue to be the most rapidly growing area in the Gulf; its population is expected to increase by more than 1.5 million over the next two decades. Texas is the next most rapidly growing state; its coastal population is expected to increase by over 1.1 million persons during this same period. Both western Florida and Texas will have the highest

Table 12. *Gulf of Mexico Population, 1960-2010*

		POPULATION											
		1960		1970		1980		1990		2000		2010	
STATE	Land Area (Sq. Mi.)	Absolute*	Density**	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density
FLORIDA	54,153	4,952	91	6,791	125	9,746	180	12,837	237	14,811	273	16,143	298
Coastal	36,943	2,207	60	2,890	78	4,234	115	5,668	153	6,580	178	7,187	195
Coastal Percent	**(68%)**	**(45%)**		**(43%)**		**(43%)**		**(44%)**		**(44%)**		**(45%)**	
ALABAMA	50,767	3,267	64	3,444	68	3,894	77	4,139	82	4,339	85	4,515	89
Coastal	2,827	363	129	377	133	444	157	484	171	514	182	538	190
Coastal Percent	**(6%)**	**(11%)**		**(11%)**		**(11%)**		**(12%)**		**(12%)**		**(12%)**	
MISSISSIPPI	47,233	2,178	46	2,217	47	2,521	53	2,650	56	2,770	59	2,882	61
Coastal	1,790	189	106	240	134	300	168	344	192	373	209	396	221
Coastal Percent	**(4%)**	**(9%)**		**(11%)**		**(12%)**		**(13%)**		**(13%)**		**(14%)**	
LOUISIANA	44,521	3,257	73	3,645	82	4,206	94	4,548	102	4,880	110	5,160	116
Coastal	16,535	1,912	116	2,211	134	2,592	157	2,821	171	3,053	185	3,240	196
Coastal Percent	**(37%)**	**(59%)**		**(61%)**		**(62%)**		**(62%)**		**(63%)**		**(63%)**	
TEXAS	262,017	9,580	37	11,199	43	14,229	54	17,625	67	19,727	75	21,182	81
Coastal	20,784	2,681	129	3,289	158	4,421	213	5,409	260	6,095	293	6,572	316
Coastal Percent	**(8%)**	**(28%)**		**(29%)**		**(31%)**		**(31%)**		**(31%)**		**(31%)**	
TOTAL	458,691	20,293	44	27,296	60	34,596	75	41,800	91	46,527	101	49,882	109
Coastal	78,879	7,353	93	9,006	114	11,991	152	14,726	187	16,615	211	17,932	227
Coastal Percent	**(17%)**	**(36%)**		**(33%)**		**(35%)**		**(35%)**		**(36%)**		**(36%)**	

*Thousand persons **Persons per square mile

Figure 15. *Population Change in Gulf of Mexico Coastal Counties, 1988-2010*

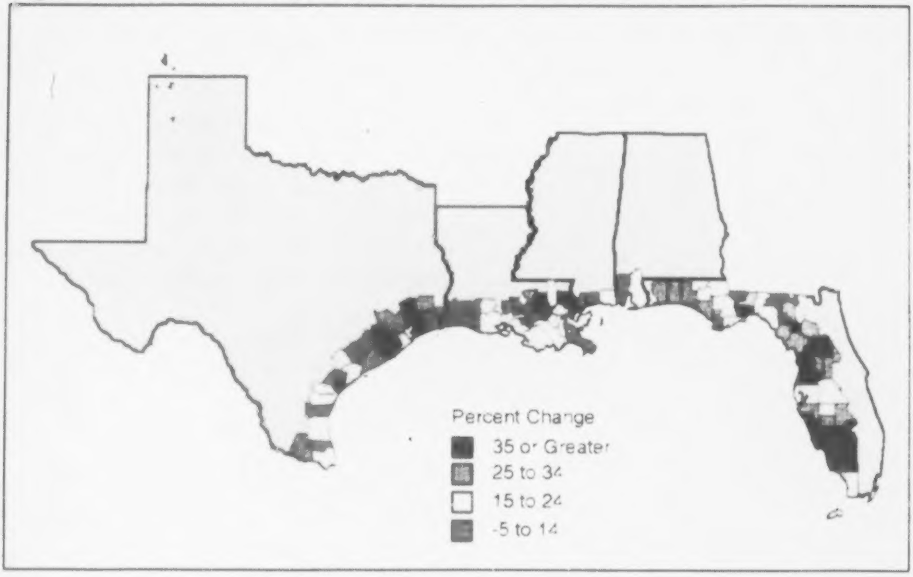

Percent Change
35 or Greater
25 to 34
15 to 24
-5 to 14

Figure 16. *Population Density in Gulf of Mexico Coastal Counties, 2010*

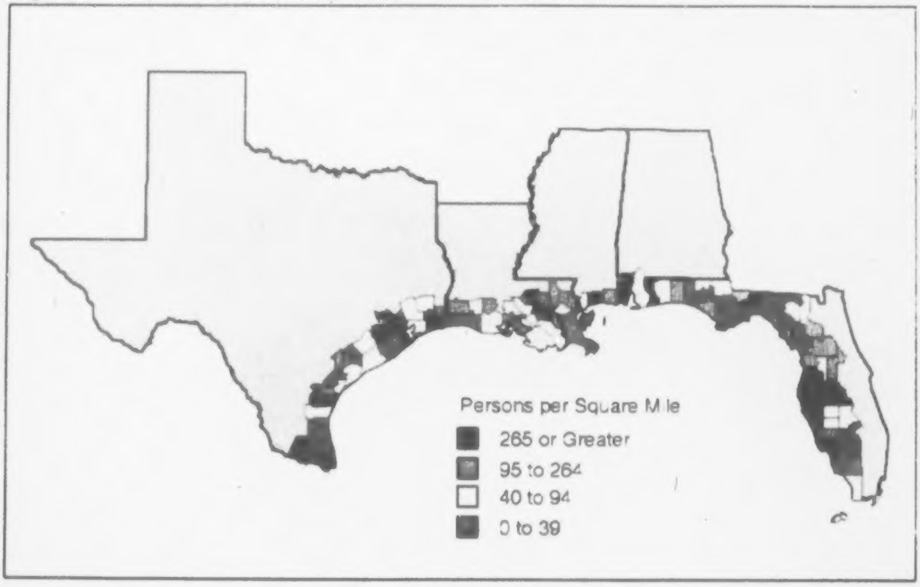
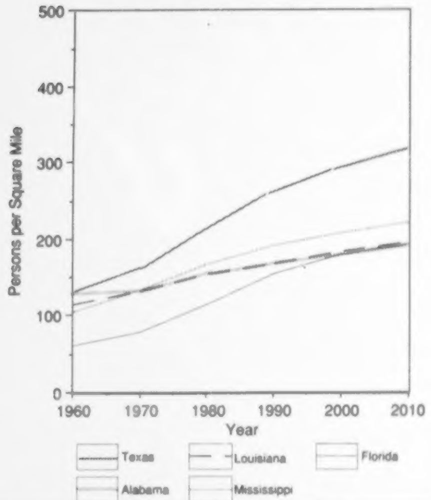

Persons per Square Mile
265 or Greater
95 to 264
40 to 94
0 to 39

Figure 17. *Gulf of Mexico Coastal Population Density, 1960-2010*



rates of growth in the Gulf, 27 and 22 percent respectively. Table 12 summarizes the change in population and population density for each coastal state between 1960 and 2010.

Although the Gulf of Mexico region is not as densely settled as other regions, it is expected to have the second fastest rate of growth. Almost one-third of all Gulf counties will increase in population by more than 30 percent over the next two decades. Figures 15 and 16 show, by coastal county, the percent change in population between 1988 and 2010, and the projected population density in 2010.

Population Density. Excluding the Pacific (because of Alaska's enormous size), the Gulf of Mexico is currently the least densely populated of the five coastal regions. Population density across the region averages about 187 persons per square mile and is expected to increase to 227 persons per square mile by 2010. As Figure 17 shows, population density in coastal Texas (316 persons per square mile) has and should continue to be the highest in the region. Western Florida, however, is projected to have the most rapid growth in population density, increasing to 195 persons per square mile in 2010, up from 60 persons per square mile in 1960, a 226 percent increase. Alabama, which shared the highest average population density with Texas in 1960, is projected to have the lowest density by 2010 (190 persons per square mile). Louisiana and Mississippi will continue to experience steady increases into 2010.

Population by Shoreline Mile. Table 13 shows that population per shoreline mile in the Gulf of Mexico will more than double between 1960 and 2010. Texas will have the highest ratio, followed by Florida. Florida's ratio will increase at a faster rate than any other Gulf state during this 50-year period. The 17,141 miles of shoreline in the Gulf region are highly valued for residential and seasonal housing, especially in Florida as its population increases into the next century.

"Hot Spots" of Growth. Table 14 lists the region's top 15 coastal counties in three categories: the counties projected

Table 13. *Gulf of Mexico Coastal Population per Shoreline Mile*

	Year		
State	1960	1988	2010
Florida	433	1,064	1,411
Alabama	599	800	886
Mississippi	527	928	1,102
Louisiana	248	352	420
Texas	798	1,517	1,956
Gulf of Mexico	429	820	1,046

Table 14. *Gulf of Mexico Leading Counties in Population Change*

County	Population Change, 1988-2010 (1,000 Persons)	County	Percent Population Change, 1988-2010	County	Population per Square Mile, 2010
Harris, TX	909	Citrus, FL	81	Pinellas, FL	3,619
Pinellas, FL	192	Hernando, FL	73	Orleans, LA	2,707
Pasco, FL	182	Pasco, FL	69	Harris, TX	2,132
Lee, FL	161	Collier, FL	63	Jefferson, LA	1,654
Hillsborough, FL	158	Charlotte, FL	62	East Baton Rouge, LA	1,082
Fort Bend, TX	113	Fort Bend, TX	55	Hillsborough, FL	924
East Baton Rouge, LA	111	Lee, FL	52	Sarasota, FL	633
Jefferson, LA	104	Chambers, TX	45	Galveston, TX	615
Sarasota, FL	102	Marion, FL	44	Pasco, FL	606
Hidalgo, TX	102	Brazoria, TX	41	Lee, FL	565
Polk, FL	91	Glades, FL	41	Escambia, FL	495
Collier, FL	87	Livingston, LA	40	Nueces, TX	410
Marion, FL	84	Hendry, FL	40	Fort Bend, TX	363
Brazoria, TX	76	St. John the Baptist, LA	39	Cameron, TX	361
Citrus, FL	75	Sarasota, FL	39	Leon, FL	356

to increase by the most people; the counties projected to increase at the fastest rate; and the counties projected to have the highest population density. The counties with the largest projected increases in absolute population are located primarily in Florida, from the Florida Keys to north of the Tampa area. Hillsborough and Pinellas counties, which include Tampa and St. Petersburg, are already heavily populated and large population increases are expected. Counties with large elderly populations such as Collier, Lee, and Pasco are also projected to have major increases over the next two decades. Projections indicate that these populations will increase by at least one-half in each county. In Harris County, TX, the projected population increase of over 900,000 represents about one-third of the county's current population.

Coastal counties in southwestern Florida will also have the largest percent increases in population over the next two decades. *Ten of the 15 most rapidly growing counties in the coastal zone of the Gulf of Mexico are located in this area.* The counties surrounding Houston (Brazoria, Chambers, and Fort Bend) will also have high growth rates during this period. The areas of lowest growth are in the northwestern corner of Florida, including several inland counties, the Louisiana-Texas border area, and parts of southeastern Texas.

Although coastal populations are increasing rapidly throughout the region, Gulf coastal counties will not be as densely settled in the near future as the major urban areas in the Northeast, Great Lakes, or Pacific regions. Only two of the 50 most densely populated counties in the U.S. coastal zone in 2010 will be in the Gulf of Mexico. However, 38 Gulf counties are projected to have a population density greater than 160 persons per square mile, or twice the national average in 2010. While Gulf counties do not have densities comparable to the most densely settled counties in the U.S., they do have some of the most rapidly increasing densities anywhere in the Nation.

Pacific Region

The Pacific region, the second most populated U.S. coastal region, contains 77 coastal counties and such major population centers as Los Angeles, San Diego, San Francisco, Seattle, Honolulu, Portland, and Anchorage. In 1988, the coastal population of this region was over 29 million, *with 77 percent of the population living in California*. By 2010, the population will have increased by 22 percent to over 35 million persons.

Population Trends. The coastal population in the Pacific region is expected to more than double between 1960 and 2010, the third highest growth rate among the five regions. By 2010, the coastal population is expected to increase by over six million persons, the largest of any coastal region. *Table 15 shows that by 2010, all states except for Oregon will have at least doubled their coastal population. Alaska's coastal population is expected to increase by 380 percent.*

The greatest changes in coastal county population occurred during the 1960s. From 1960 to the present, and projected to 2010, Alaska had the largest population growth rate. Between 1960 and 1970, Alaska's population almost doubled, while other Pacific states saw increases of only 17-28 percent. California had the second largest rate of population increase, followed closely by Washington.

Growth in the region slowed considerably between 1970 and 1980. Although Alaska's population grew by over one-third, California had the smallest population growth rate (15 percent). Average growth across the region was approximately 17 percent. Estimates of population growth for the 1980s are similar to the growth that occurred during the 1960s. Growth in Alaska will exceed 40 percent. California follows with over 20 percent growth. The smallest growth rate is anticipated in Oregon.

Population projections for the next two decades reflect a slower rate of growth. Alaska's rate will be the largest, followed by Washington, California, Ha-

Table 15. *Pacific Population, 1960-2010*

		POPULATION											
		1960		1970		1980		1990		2000		2010	
STATE	Land Area (Sq. Mi.)	Absolute*	Density**	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density
CALIFORNIA	156,299	15,717	101	19,971	128	23,668	151	29,040	186	32,482	208	34,901	223
Coastal	38,188	13,073	342	16,662	436	19,238	504	23,091	605	25,605	671	27,429	718
Coastal Percent	**(24%)**	**(83%)**		**(83%)**		**(81%)**		**(80%)**		**(79%)**		**(79%)**	
OREGON	96,184	1,769	18	2,092	22	2,633	27	2,808	29	3,042	32	3,222	34
Coastal	19,669	1,107	56	1,300	66	1,552	79	1,612	82	1,721	88	1,815	92
Coastal Percent	**(20%)**	**(63%)**		**(62%)**		**(59%)**		**(57%)**		**(57%)**		**(56%)**	
WASHINGTON	66,511	2,853	43	3,413	51	4,132	62	4,733	71	5,235	79	5,593	84
Coastal	20,645	1,992	97	2,523	122	3,045	148	3,548	172	3,962	192	4,253	206
Coastal Percent	**(31%)**	**(70%)**		**(74%)**		**(74%)**		**(75%)**		**(76%)**		**(76%)**	
ALASKA	570,833	226	0	303	1	402	1	555	1	641	1	698	1
Coastal	380,161	125	0	245	1	334	1	472	1	549	1	600	2
Coastal Percent	**(67%)**	**(55%)**		**(81%)**		**(83%)**		**(85%)**		**(86%)**		**(86%)**	
HAWAII	6,425	633	98	770	120	965	150	1,118	174	1,222	190	1,307	203
Coastal	6,425	633	98	770	120	965	150	1,118	174	1,222	190	1,307	203
Coastal Percent	**(100%)**	**(100%)**		**(100%)**		**(100%)**		**(100%)**		**(100%)**		**(100%)**	
TOTAL	896,252	21,198	24	26,548	30	31,800	35	38,254	43	42,623	48	45,721	51
Coastal	465,088	16,930	36	21,500	46	25,134	54	29,840	64	33,061	71	35,404	76
Coastal Percent	**(52%)**	**(80%)**		**(81%)**		**(79%)**		**(78%)**		**(78%)**		**(77%)**	

*Thousand persons **Persons per square mile

Figure 18. *Population Change in Pacific Coastal Counties, 1988-2010*

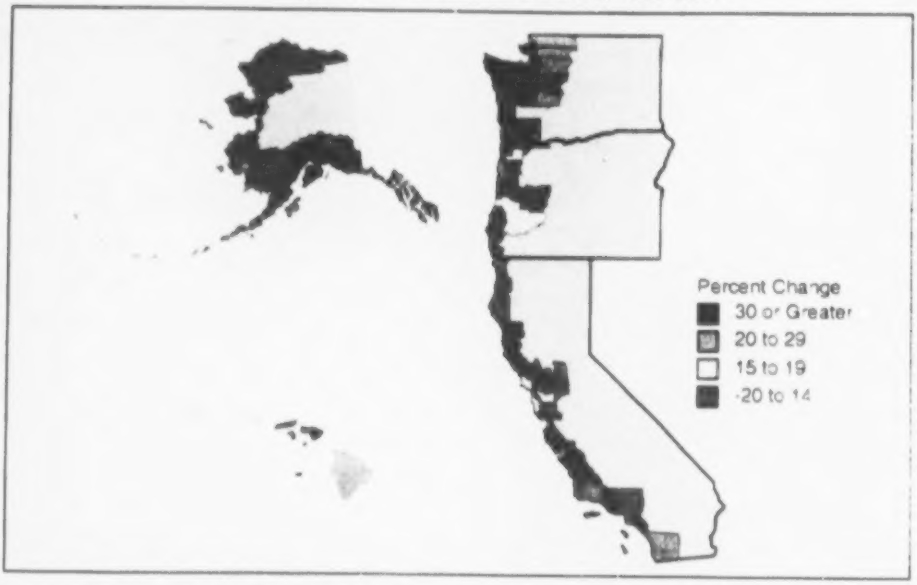

Percent Change
30 or Greater
20 to 29
15 to 19
-20 to 14

Figure 19. *Population Density in Pacific Coastal Counties, 2010*

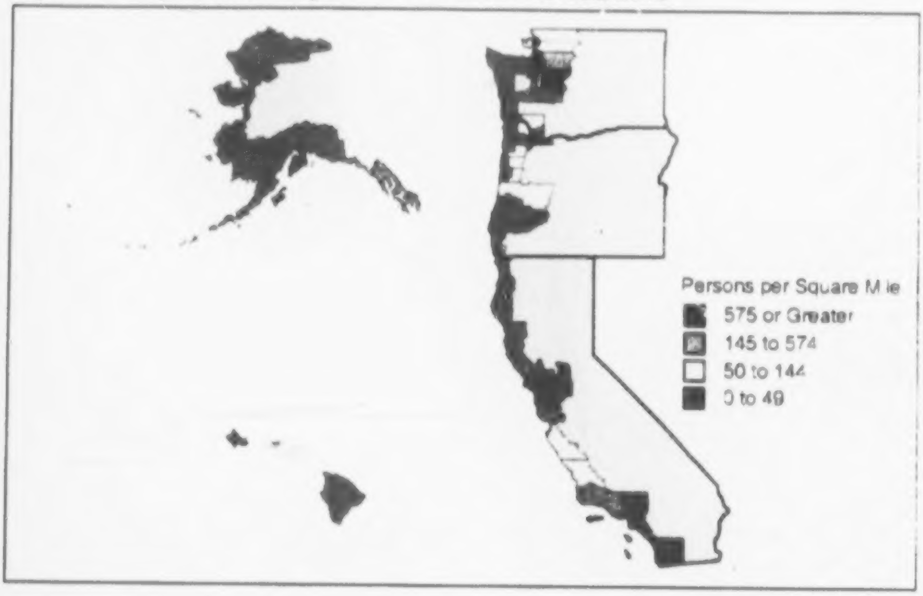
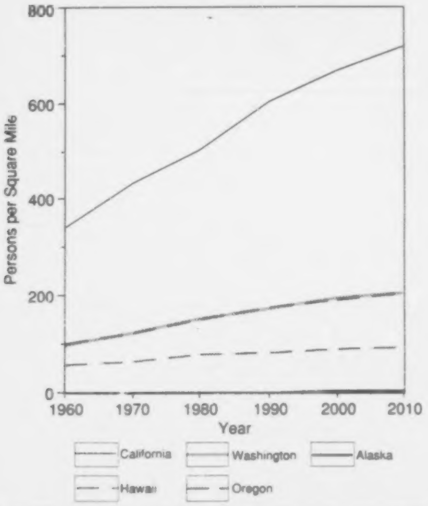

Persons per Square Mile
575 or Greater
145 to 574
50 to 144
0 to 49

Figure 20. *Pacific Coastal Population Density, 1960-2010*



waii, and Oregon (Figure 18). Overall, the rate of growth in the Pacific region is, and will continue to be, higher than in the Northeast and Great Lakes, but lower than for the Southeast and the Gulf of Mexico.

Population Density. The Pacific (including Alaska) is the least densely populated coastal region. Population density in the Pacific region averages 36 persons per square mile, well below the national average. However, population density across the region is highly variable, ranging from the sparsely populated state of Alaska to the densely populated coastal areas of California (particularly southern California), as well as Hawaii. Between 1960-2010, population densities in California are consistently the highest of all the states in the region, followed by Hawaii, Washington, Oregon, and Alaska (Figure 20). Increases in population density since the 1960s have been relatively consistent; projections for the next two decades show smaller increases in density. By 2010, population density is projected to increase to 76 persons per square mile, just above the national average. The total increase is only 40 persons per square mile over the 50-year period.

Table 16. *Pacific Coastal Population per Shoreline Mile*

	Year		
State	1960	1988	2010
California	3,815	6,551	8,004
Oregon	785	1,140	1,287
Washington	658	1,163	1,405
Alaska	4	13	18
Hawaii	601	1,044	1,242
Pacific	395	680	827

Excluding Alaska, the population density for the Pacific region is dramatically different. The Pacific would rank third in population density in 1960 (148 persons per square mile), after the Northeast and Great Lakes, and second only after the Northeast in 2010.

Coastal California population density will more than double, from 342 persons per square mile in 1960 to an estimated 718 persons per square mile in 2010. Washington and Hawaii follow, with increases of 109 persons per square mile and 104 persons per square mile, respectively, over the same 50 year period.

Population by Shoreline Mile. Population-to-shoreline ratios shown in Table 16 indicate that the Pacific currently has the lowest ratio of all the regions. California currently has the highest ratio, and projections suggest that it will more than double from 1960 to 2010. Alaska's population-to-shoreline ratio is so low that it distorts the regional perspective. The average regional ratio will not increase as dramatically as in the Gulf of

Table 17. *Pacific Leading Counties in Population Change*

County	Population Change, 1988-2010 (1,000 Persons)	County	Percent Population Change, 1988-2010	County	Population per Square Mile, 2010
Los Angeles, CA	1,271	Kenai Peninsula, AK	65	San Francisco, CA	18,913
Orange, CA	704	Matanuska-Susitna, AK	57	Orange, CA	3,710
San Diego, CA	620	San Juan, WA	51	Los Angeles, CA	2,422
Santa Clara, CA	428	Santa Cruz, CA	50	Alameda, CA	1,998
Alameda, CA	229	Thurston, WA	47	San Mateo, CA	1,657
Ventura, CA	222	San Luis Obispo, CA	46	Honolulu, HI	1,627
Sacramento, CA	202	Anchorage, AK	45	Santa Clara, CA	1,439
Contra Costa, CA	199	Jefferson, WA	44	Multnomah, OR	1,359
King, WA	186	Mason, WA	43	Contra Costa, CA	1,320
Sonoma, CA	153	Sonoma, CA	42	Sacramento, CA	1,214
San Francisco, CA	138	Solano, CA	40	King, WA	764
Honolulu, HI	131	Mendocino, CA	39	Santa Cruz, CA	760
Solano, CA	124	Island, WA	39	San Diego, CA	710
Pierce, WA	117	Kitsap, WA	36	Kitsap, WA	627
San Mateo, CA	112	Maui, HI	35	Solano, CA	526

Mexico, Southeast, or Northeast. The very high concentration of population along the shoreline, particularly in California, reflects the desirability of shoreline property for residential housing.

"Hot Spots" of Growth. Table 17 lists the top 15 coastal counties for three categories: the counties projected to increase by the most people; the counties projected to increase at the fastest rate; and the counties projected to have the highest population density. With respect to increasing population sizes between 1988 and 2010, 12 of the counties are located in California. Not surprisingly, Los Angeles, Orange, and San Diego counties top the list, with Los Angeles County expecting an increase of 1.3 million persons. The other California counties in this ranking are part of the Southern California and San Francisco Bay metropolitan areas. King and Pierce counties, WA, and Honolulu also make this list.

Population density projections for 2010 show a similar pattern. Eleven of the leading coastal counties are in California, concentrated around San Francisco, Los Angeles, and San Diego. In 1960, almost one-half of California's total population, and almost 60 percent of the state's coastal population, were concentrated in the three southernmost counties. By 2010, 15.8 million persons will reside in these counties. Although these counties are already densely populated, significant growth is still expected into the next century. King and Kitsap counties (located around Puget Sound), Honolulu, and Multnomah (where Portland is located), are also densely populated.

The top 10 counties on the list all have population densities greater than 1,000 persons per square mile. San Francisco is the most densely populated, with over 18,900 persons per square mile. Orange County is second, with over 3,700 persons per square mile, and Los Angeles County third, with over 2,400 persons per square mile. The ranking changes dramatically in terms of percent population change during this same period. Growth of the leading counties ranges from 35-75 percent. Two of the top three counties are located in south-central Alaska and reflect the growth anticipated out from Anchorage. Two of the top five are in Washington. As expected, the greatest growth will occur in less densely populated places, where there is more capability for expansion of a small population base (Figure 19).

Summary

Population projections are inherently imprecise and do not provide the "final picture" because of unforeseen economic or social changes. In addition, projections are much less certain as the geography becomes smaller, e.g., at the county level, and with increases in the time horizon. The summary data presented in this paper should be interpreted cautiously, but not to the extent that they diminish the existing and growing importance of coastal areas.

As coastal populations increase across the U.S., the management of this growth and its direct and indirect effects from this growth will be even more important than today. The Nation's large and growing coastal population already has indirectly resulted in significant losses of habitat and living resources, increased demands on water, energy, and waste treatment and disposal, and diminished environmental quality in many areas. Although population increases are an indicator of economic development, the concomitant side-effects of this growth create new environmental challenges to both public and private interests.

Acknowledgements

We would like to thank Charles N. Ehler, Director, Office of Oceanography and Marine Assessment, and Daniel J. Basta, Chief, Strategic Assessment Branch, for their guidance and support of this report and the coastal trends series. Kevin D. McMahon and Mitchell J. Katz provided editorial support. The Bureau of the Census provided all pre-1990 population data.

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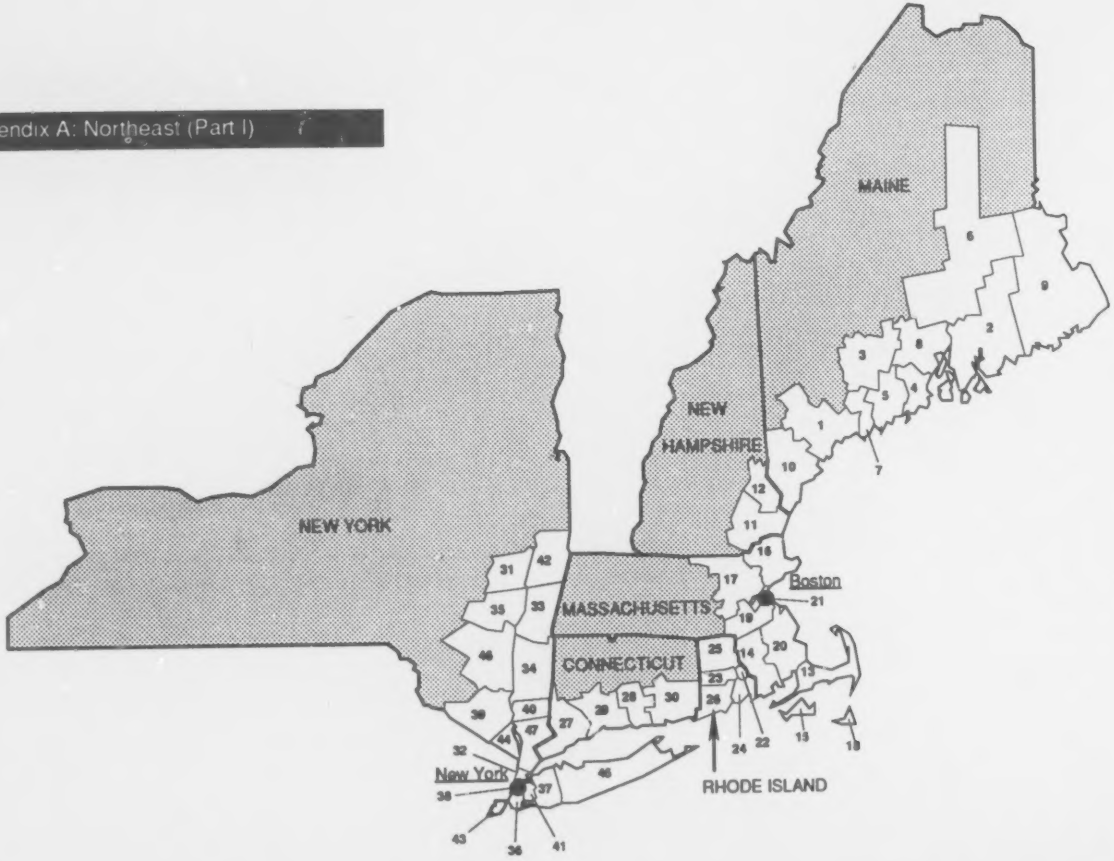
Personal Communication

C. Harrington, National Ocean Service, National Oceanic and Atmospheric Administration, Rockville, MD.

Appendix A: Northeast (Part I)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Coastal Counties

Maine

1 Cumberland
2 Hancock
3 Kennebec
4 Knox
5 Lincoln
6 Penobscot
7 Sagadahoc
8 Waldo
9 Washington
10 York

New Hampshire

11 Rockingham
12 Strafford

Massachusetts

13 Barnstable
14 Bristol
15 Dukes
16 Essex
17 Middlesex
18 Nantucket
19 Norfolk
20 Plymouth
21 Suffolk

Rhode Island

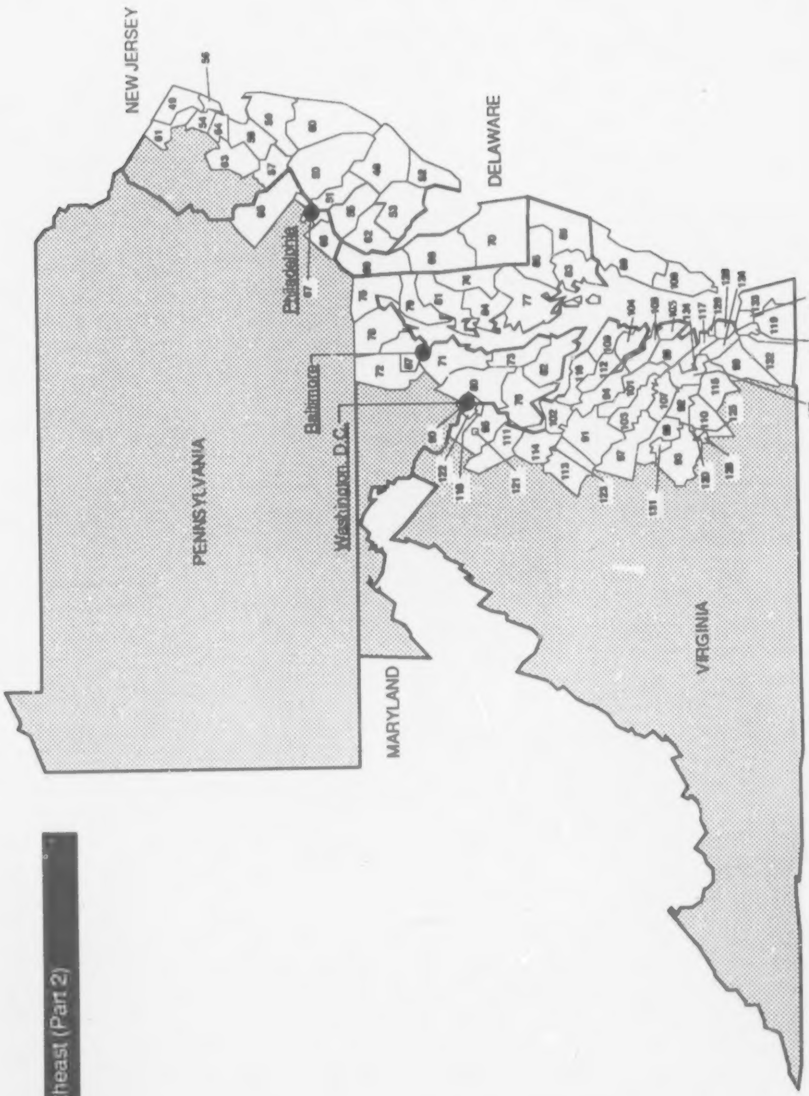
22 Bristol
23 Kent
24 Newport
25 Providence
26 Washington

Conneticut

27 Fairfield
28 Middlesex
29 New Haven
30 New London

New York

31 Albany
32 Bronx
33 Columbia
34 Dutchess
35 Greene
36 Kings
37 Nassau
38 New York
39 Orange
40 Putnam
41 Queens
42 Rensselaer
43 Richmond
44 Rockland
45 Suffolk
46 Ulster
47 Westchester


NEW JERSEY
DELAWARE
PENNSYLVANIA
Philadelphia
Baltimore
Washington, D.C.
MARYLAND
VIRGINIA

Appendix A: Northeast (Part 2)

Coastal Counties

New Jersey

48 Atlantic
49 Bergen
50 Burlington
51 Camden
52 Cape May
53 Cumberland
54 Essex
55 Gloucester
56 Hudson
57 Mercer
58 Middlesex
59 Monmouth
60 Ocean
61 Passaic
62 Salem
63 Somerset
64 Union

Pennsylvania

65 Bucks
66 Delaware
67 Philadelphia

Delaware

68 Kent
69 New Castle
70 Sussex

Maryland

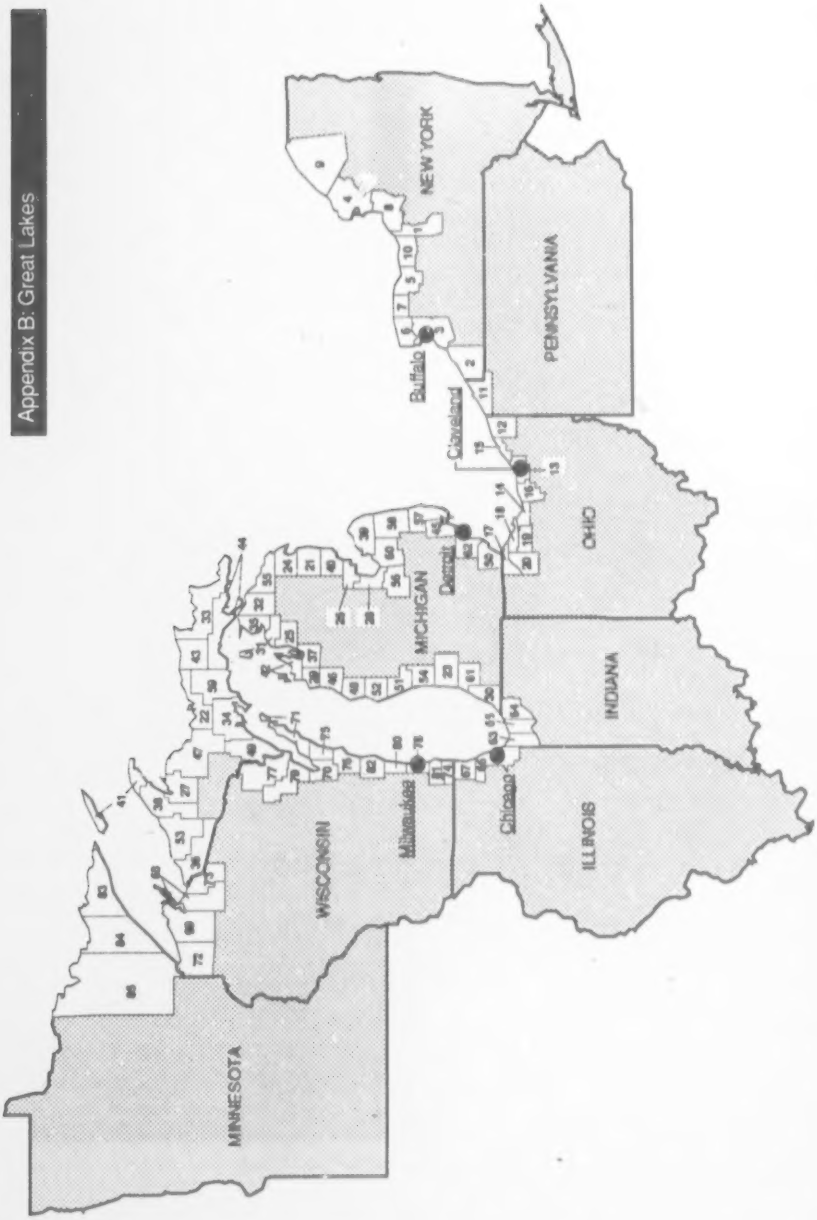
71 Anne Arundel
72 Baltimore
73 Calvert
74 Caroline
75 Cecil
76 Charles
77 Dorchester
78 Harford
79 Kent
80 Prince George's
81 Queen Anne's
82 St. Mary's
83 Somerset
84 Talbot
85 Wicomico
86 Worcester
87 Baltimore City

88 *District of Columbia*

Virginia

89 Accomack
90 Arlington
91 Caroline
92 Charles City
93 Chesterfield
94 Essex
95 Fairfax
96 Gloucester
97 Hanover
98 Henrico
99 Isle of Wight
100 James City
101 King and Queen
102 King George
103 King William
104 Lancaster
105 Mathews
106 Middlesex
107 New Kent
108 Northampton
109 Northumberland
110 Prince George
111 Prince William
112 Richmond
113 Spotsylvania
114 Stafford
115 Surry
116 Westmoreland
117 York
118 Alexandria
119 Chesapeake
120 Colonial Heights
121 Fairfax
122 Falls Church
123 Fredericksburg
124 Hampton
125 Hopewell
126 Newport News
127 Norfolk
128 Petersburg
129 Poquoson
130 Portsmouth
131 Richmond
132 Suffolk
133 Virginia Beach
134 Williamsburg

Appendix B: Great Lakes


NEW YORK
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OHIO
INDIANA
ILLINOIS
MICHIGAN
WISCONSIN
MINNESOTA
Buffalo
Cleveland
Detroit
Milwaukee
Chicago

Coastal Counties

New York
1 Cayuga
2 Chautauqua
3 Erie
4 Jefferson
5 Monroe
6 Niagara
7 Orleans
8 Oswego
9 St. Lawrence
10 Wayne

Pennsylvania
11 Erie

Ohio
12 Ashtabula
13 Cuyahoga
14 Erie
15 Lake
16 Lorain
17 Lucas
18 Ottawa
19 Sandusky
20 Wood

Michigan
21 Alcona
22 Alger
23 Allegan
24 Alpena
25 Antrim
26 Arenac
27 Baraga
28 Bay
29 Benzie
30 Berrien
31 Charlevoix
32 Cheboygan
33 Chippewa
34 Delta
35 Emmet
36 Gogebic
37 Grand Traverse
38 Houghton
39 Huron
40 Iosco
41 Keweenaw
42 Leelanau
43 Luce
44 Mackinac
45 Macomb
46 Manistee
47 Marquette
48 Mason
49 Menominee
50 Monroe
51 Muskegon
52 Oceana
53 Ontonagon
54 Ottawa
55 Presque Isle
56 Saginaw
57 St. Clair
58 Sanilac
59 Schoolcraft
60 Tuscola
61 Van Buren
62 Wayne

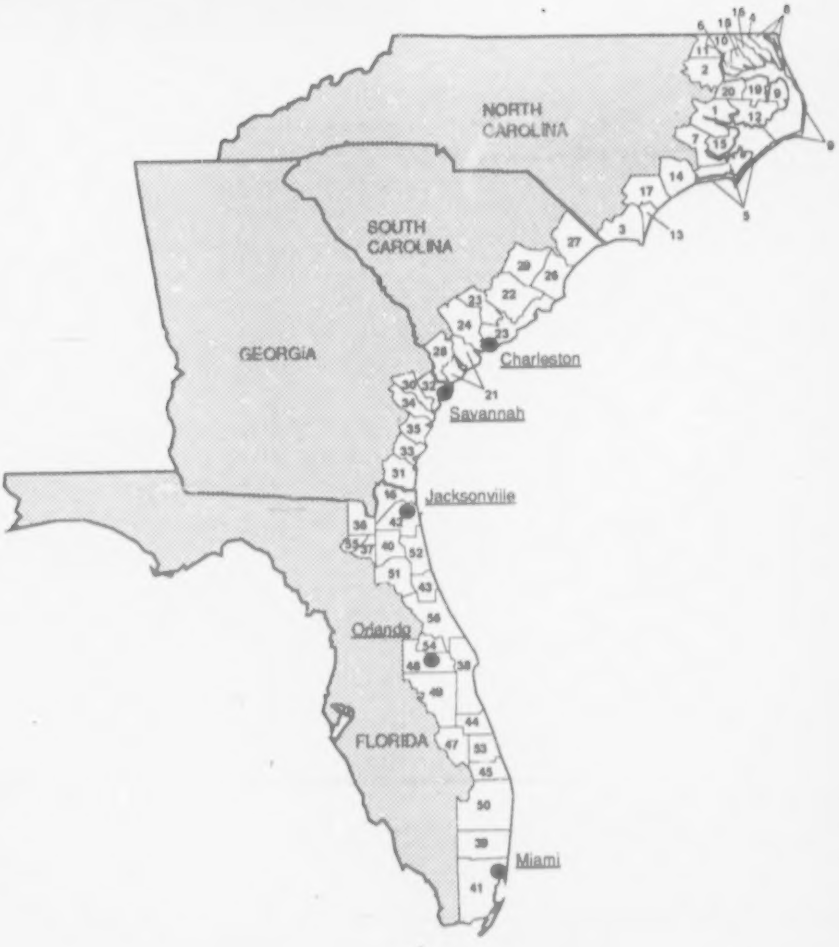
Indiana
63 Lake
64 La Porte
65 Porter

Illinois
56 Cook
67 Lake

Wisconsin
68 Ashland
69 Bayfield
70 Brown
71 Door
72 Douglas
73 Iron
74 Kenosha
75 Kewaunee
76 Manitowoc
77 Marinette
78 Milwaukee
79 Oconto
80 Ozaukee
81 Racine
82 Sheboygan

Minnesota
83 Cook
84 Lake
85 St. Louis

Appendix C: Southeast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Coastal Counties

North Carolina

1 Beaufort
2 Bertie
3 Brunswick
4 Camden
5 Carteret
6 Chowan
7 Craven
8 Currituck
9 Dare
10 Gates
11 Hertford
12 Hyde
13 New Hanover
14 Onslow
15 Pamlico
16 Pasquotank
17 Pender
18 Perquimans
19 Tyrrell
20 Washington

South Carolina

21 Beaufort
22 Berkeley
23 Charleston
24 Colleton
25 Dorchester
26 Georgetown
27 Horry
28 Jasper
29 Williamsburg

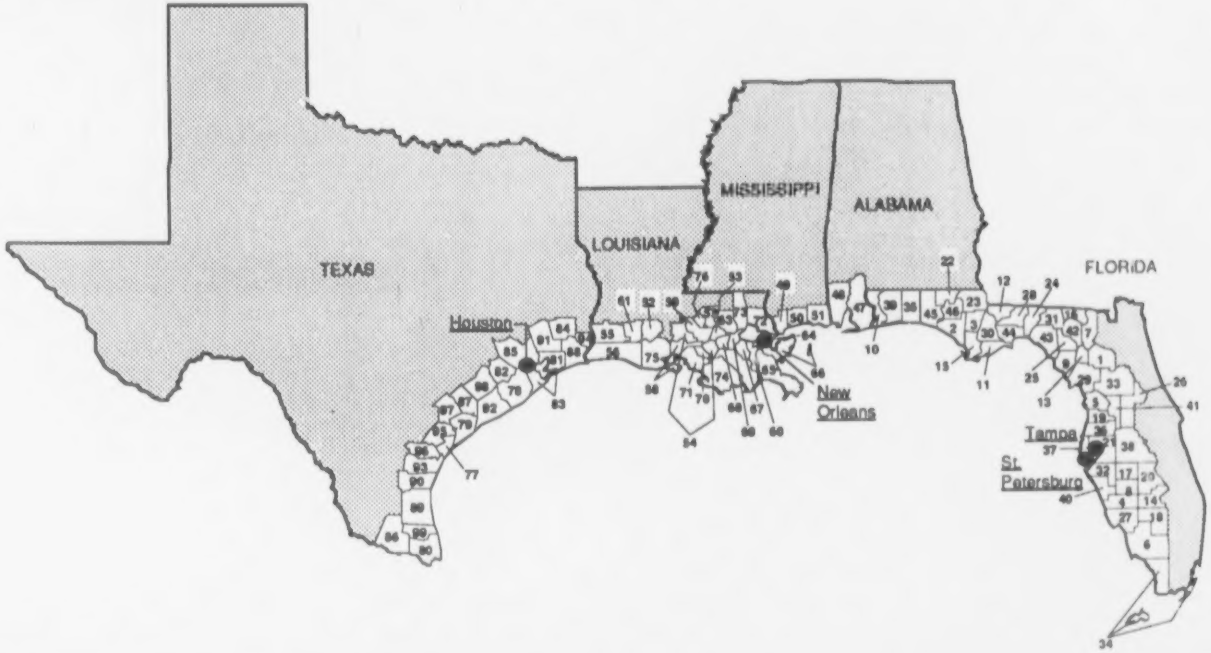
Georgia

30 Bryan
31 Camden
32 Chatham
33 Glynn
34 Liberty
35 McIntosh

Florida

36 Baker
37 Bradford
38 Brevard
39 Broward
40 Clay
41 Dade
42 Duval
43 Flagler
44 Indian River
45 Martin
46 Nassau
47 Okeechobee
48 Orange
49 Osceola
50 Palm Beach
51 Putnam
52 St. Johns
53 St. Lucie
54 Seminole
55 Union
56 Volusia

Appendix D: Gulf of Mexico


TEXAS
LOUISIANA
MISSISSIPPI
ALABAMA
FLORIDA
Houston
New Orleans
Tampa
St. Petersburg

Coastal Counties

Florida

1 Alachua
2 Bay
3 Calhoun
4 Charlotte
5 Citrus
6 Collier
7 Columbia
8 De Soto
9 Dixie
10 Escambia
11 Franklin
12 Gadsden
13 Gilchrist
14 Glades
15 Gulf
16 Hamilton
17 Hardee
18 Hendry
19 Hernando
20 Highlands
21 Hillsborough
22 Holmes
23 Jackson
24 Jefferson
25 Lafayette
26 Lake
27 Lee
28 Leon
29 Levy
30 Liberty
31 Madison
32 Manatee
33 Marion
34 Monroe
35 Okaloosa
36 Pasco
37 Pinellas
38 Polk
39 Santa Rosa
40 Sarasota
41 Sumter
42 Suwannee
43 Taylor
44 Wakulla
45 Walton
46 Washington

Alabama

47 Baldwin
48 Mobile

Mississippi

49 Hancock
50 Harrison
51 Jackson

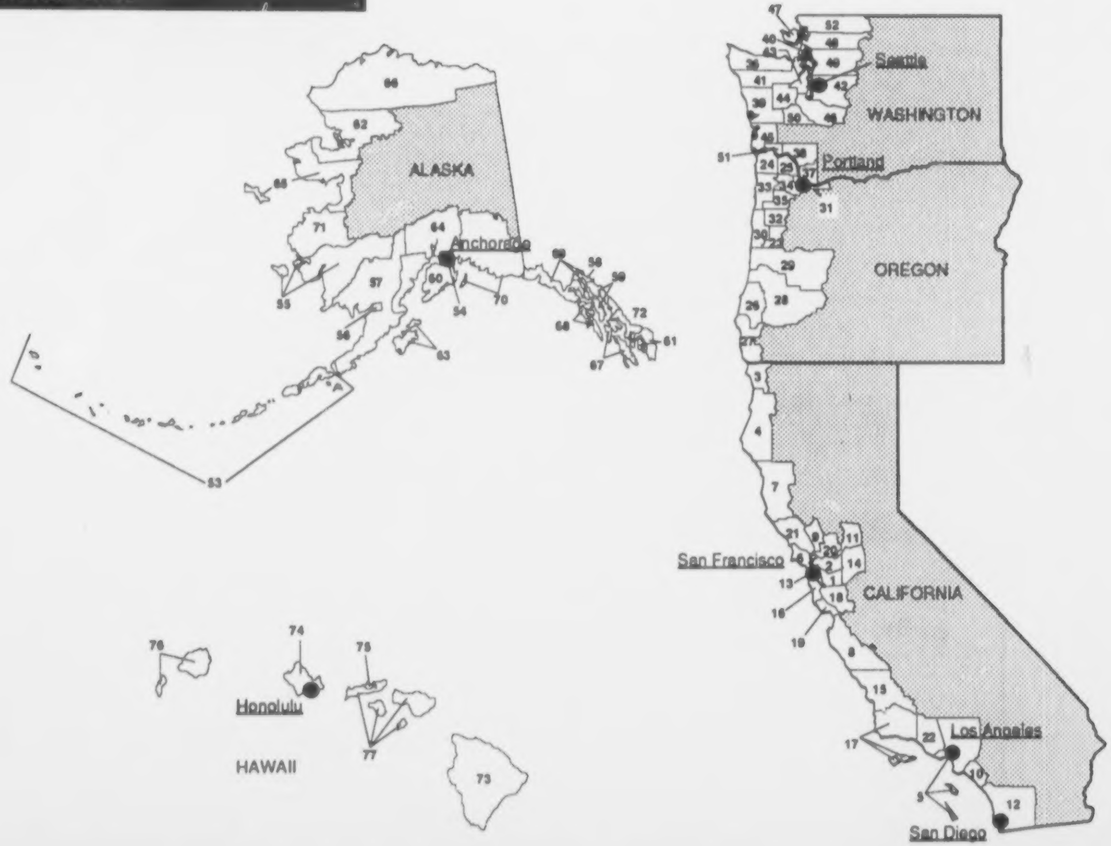
Louisiana

52 Acadia
53 Ascension
54 Assumption
55 Calcasieu
56 Cameron
57 East Baton Rouge
58 Iberia
59 Iberville
60 Jefferson
61 Jefferson Davis
62 Lafourche
63 Livingston
64 Orleans
65 Plaquemines
66 St. Bernard
67 St. Charles
68 St. James
69 St. John the Baptist
70 St. Martin
71 St. Mary
72 St. Tammany
73 Tangipahoa
74 Terrebonne
75 Vermilion
76 West Baton Rouge

Texas

77 Aransas
78 Brazoria
79 Calhoun
80 Cameron
81 Chambers
82 Fort Bend
83 Galveston
84 Hardin
85 Harris
86 Hidalgo
87 Jackson
88 Jefferson
89 Kenedy
90 Kleberg
91 Liberty
92 Matagorda
93 Nueces
94 Orange
95 Refugio
96 San Patricio
97 Victoria
98 Wharton
99 Willacy

Appendix E: Pacific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Coastal Counties

California
1 Alameda
2 Contra Costa
3 Del Norte
4 Humboldt
5 Los Angeles
6 Marin
7 Mendocino
8 Monterey
9 Napa
10 Orange
11 Sacramento
12 San Diego
13 San Francisco
14 San Joaquin
15 San Luis Obispo
16 San Mateo
17 Santa Barbara
18 Santa Clara
19 Santa Cruz
20 Solano
21 Sonoma
22 Ventura

Oregon
23 Benton
24 Clatsop
25 Columbia
26 Coos
27 Curry
28 Douglas
29 Lane
30 Lincoln
31 Multnomah
32 Polk
33 Tillamook
34 Washington
35 Yamhill

Washington
36 Clallam
37 Clark
38 Cowlitz
39 Grays Harbor
40 Island
41 Jefferson
42 King
43 Kitsap
44 Mason
45 Pacific
46 Pierce
47 San Juan
48 Skagit
49 Snohomish
50 Thurston
51 Wahkiakum
52 Whatcom

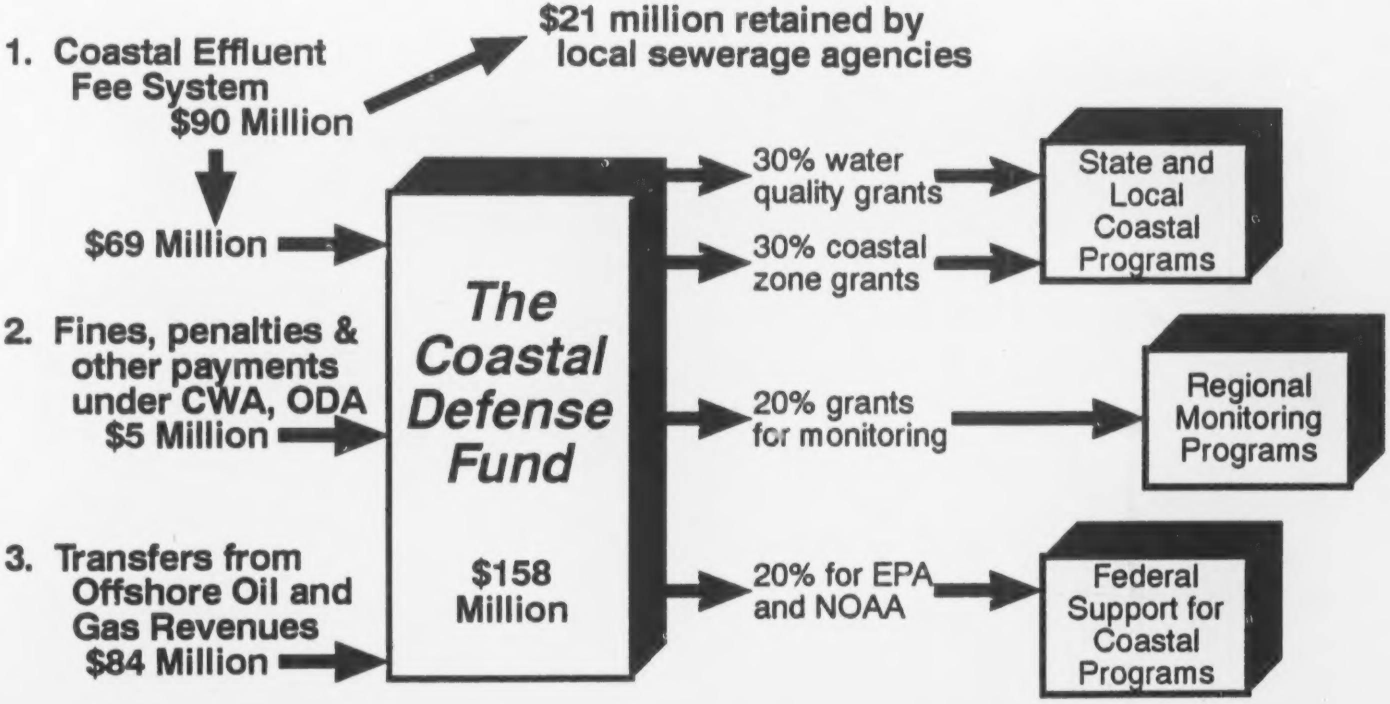
Alaska
53 Aleutian Islands
54 Anchorage
55 Bethel
56 Bristol Bay
57 Dillingham
58 Haines
59 Juneau
60 Kenai Peninsula
61 Ketchikan Gateway
62 Kobuk
63 Kodiak Island
64 Matanuska-Susitna
65 Nome
66 North Slope
67 Prince of Wales-Outer Ketchikan
68 Sitka
69 Skagway-Yakutat-Angoon
70 Valdez-Cordova
71 Wade Hampton
72 Wrangell-Petersburg

Hawaii
73 Hawaii
74 Honolulu
75 Kalawao
76 Kauai
77 Maui

Funding H.R. 2647 - The Coastal Defense Initiative

Introduced by Rep. Gerry E. Studds

(Preliminary estimates)



1. Coastal Effluent Fee System $90 Million

$21 million retained by local sewerage agencies

$69 Million

2. Fines, penalties & other payments under CWA, ODA $5 Million

3. Transfers from Offshore Oil and Gas Revenues $84 Million

The Coastal Defense Fund

$158 Million

30% water quality grants

30% coastal zone grants

State and Local Coastal Programs

20% grants for monitoring

Regional Monitoring Programs

20% for EPA and NOAA

Federal Support for Coastal Programs

Funding the Coastal Defense Initiative With Coastal Effluent Fees

- ***Where will the coastal effluent fee system apply ?***
  - 30 Coastal and Great Lakes States, plus Puerto Rico, Virgin Islands, and the Territories
- ***Who pays ?***
  - Industrial point source dischargers into coastal waters
  - Significant industrial users of publicly owned treatment works (POTWs) that discharge into coastal waters
- ***How much will fees collect ?***
  - Preliminary estimates: $90 million (See chart - "Funding H.R. 2647")
- ***Basis of fees ?***
  - In the aggregate, program costs to implement Clean Water Act permit and industrial pretreatment programs in coastal States
- ***How much will fees be ?***
  - EPA will calculate fees for categories of dischargers, based on volume of discharge, toxicity, and other factors
    - Fees will vary
    - IF fee were based only on volume, a source discharging one million gallons per day would pay about $11,000 in fees annually
    - A source with toxic pollutants in its discharge would likely pay more; a source with non-toxic wastes would likely pay less
- ***Who collects the fees ?***
  - EPA collects fees and deposits revenues in the Coastal Defense Fund unless:
    - If a State has fee system, EPA collects amounts from individual sources equal to difference between State and Federal fee systems
    - If a State has fee system that collects amounts equivalent to the Federal system, State may petition EPA to waive Federal fees
    - POTW control authority collects, retains fees paid by industrial users

COASTAL POLLUTION

THURSDAY, MAY 10, 1990

House of Representatives,
Subcommittee on Water Resources,
Committee on Public Works and Transportation,
Washington, DC.

The subcommittee met, pursuant to call, at 10:00 a.m. in room 2167, Rayburn House Office Building, Hon. Henry J. Nowak [chairman of the subcommittee] presiding.

Mr. **Nowak**. The subcommittee will come to order.

This morning the Subcommittee on Water Resources meets to continue to receive testimony on issues relating to coastal pollution.

As we heard from our Federal witnesses yesterday, pollution in our coastal waters is significant and widespread. Representatives of both NOAA, the Fish and Wildlife Service noted extensive contamination of fish and the benthic community.

Pollution in coastal waters comes from an array of sources, including industrial and municipal sewage treatment plant discharges, urban and rural nonpoint source runoff, storm water and combined sewer overflow drains, and atmospheric deposition.

The EPA reports that cumulatively, the pollutants from these sources have degraded the coastal environment by damaging critical habitats, contaminating fish with toxins, and posing risks to public health.

The hearing will focus on the significance of pollution of coastal waters compared to the pollution of other surface waters. The subcommittee will also hear testimony on the relative importance of the various sources of contamination and the effectiveness of current and proposed protection and restoration measures.

I am pleased to have testifying before us today several individuals who have made important contributions, including our lead-off witness, in both bringing attention to the seriousness of our coastal pollution problems and in assisting our committee and others in addressing these problems.

Before we begin with our first witness, I would like to yield to my distinguished colleague from Minnesota, the Ranking Republican Member of the Subcommittee, Congressman Stangeland, for whatever opening remarks he would wish to make.

Mr. **Stangeland**. I have an opening statement, but I wish it to be made part the record, and I am not going to take the time to read it.

I want to welcome Congresswoman Lowey and also Congresswoman Molinari. Again today I have markup in the House Agricultural Committee on the Farm Bill; but apparently, this then will be a hearing with a New York connection, but I will stay through Congresswoman Lowey's testimony, and I will just ask that my statement be made part of the record.

Thank you.

[The statement of Hon. Arlan Stangeland follows:]

STATEMENT OF HON. ARLAN STANGELAND

Thank you, Mr. Chairman. The Water Resources Subcommittee meets today to continue its series of hearings on coastal pollution.

Yesterday, we heard from EPA, NOAA, the Fish and Wildlife Service, and—for a State's perspective—the New York Department of Environmental Conservation. They described the problems and their current authorities and programs. We also received testimony on comprehensive bills dealing with coastal zone management and coastal water quality, such as H.R. 4030 and H.R. 2647.

Today, we'll hear from the Office of Technology Assessment which stimulated much of the debate in 1987 with its thorough report, "*Wastes in Marine Environments.*" Environmental organizations will also testify on current agency programs and proposals, as well as possible legislative initiatives. In addition, we will hear from the Association of State and Interstate Water Pollution Control Administrators to get their important views on this truly national problem.

Congresswoman Nita Lowey also plans to testify on a regional issue, pollution in Long Island Sound and establishment of an EPA program office, as well as the Section 320 National Estuaries Program.

From this broad data base, we can begin to analyze legislative proposals and consider initiatives addressing, among other things, combined sewer overflows, contaminated sediments, and coastal water quality standards.

I look forward to working with you, Mr. Chairman, and all our colleagues and witnesses. We all recognize the need to increase protection of our coastal waters. Now we just need to figure out exactly what to do and how to fund it.

Thank you.

Mr. NOWAK. Thank you very much, and we will take Congressperson Lowey's testimony at this time. She has certainly been, in a short time of Congress, one of the more vocal advocates of water problems in general, in trying to solve them and find solutions to these very vexing problems, and has certainly brought expertise in many of the local problems that she is so familiar with from her very vast past experience in local state government.

We want to welcome you before the subcommittee, and we will accept your total statement into the record and let you proceed as you so desire.

TESTIMONY OF HON. NITA M. LOWEY, A REPRESENTATIVE IN CONGRESS FROM NEW YORK

Mrs. LOWEY. Thank you very much.

I want to begin by thanking the distinguished Chairman, Mr. Nowak, for arranging these hearings on coastal pollution and for this chance to appear before your subcommittee this morning.

As you all know, this hearing closely follows the approval by the Merchant Marine and Fisheries committee of H.R. 2647, the Coastal Defense Initiative, or CDI.

At its core, CDI asserts the need for the Federal Government to maintain a positive and substantive role in efforts to save our coastal resources.

The challenge is to craft legislation that permits states and localities maximum flexibility while allowing the Federal Government to guide and support the development and implementation of coastal protection plans.

CDI was written with the understanding that the responsibility of implementing coastal protection programs rests largely with the states. There is, however, a vital need for coordination, technical assistance, and other forms of support that only the Federal Government can provide.

CDI provides a balanced approach that taps the potential of Federal, state and local agencies for contributing to coastal protection. In particular, CDI improves the process of developing and implementing coastal water quality plans by increasing the cooperation of coastal land management and water quality agencies.

In order to be successful, coastal water quality plans must be developed jointly by agencies responsible for coastal land management and water protection.

CDI closely integrates land management and water quality efforts to develop remedial programs to save coastal waters. As such, the bill represents a major breakthrough for efforts to penetrate the bureaucratic walls that have insulated these two programs from each other.

These changes were fashioned largely from the recommendations of New York State's Department of Environmental Conservation and New York's Department of State, agencies which have been exemplary in their willingness to set aside institutional differences and work together on this legislation.

As you know, CDI contains a provision which I authorized that extends the management conference established under the National Estuary Program and creates a Long Island Sound Conservancy within EPA to coordinate clean-up and protection efforts in the Sound.

At present, the federal role in protecting the Nation's estuaries through the national Estuary Program extends only through the development of management plans.

Current law does not provide for Federal support for the implementation of these plans.

Mr. Chairman, in the next year and a half, comprehensive conservation and management plans for four of this country's most vital estuaries will reach the implementation phase.

At this crucial point in the effort to save our estuaries, we must ensure a continued, effective federal presence in these areas.

In other vital estuaries, such as the Great Lakes and Chesapeake Bay, a continued federal commitment to support clean-up efforts has been essential to the success of those programs.

CDI requires that management plans include specific federal, state and local obligations to clarify the responsibilities of various agencies so that programs called for in the plans are actually carried out.

The bill also extends the management conference from five to 10 years, so that the groups responsible for developing protection plans for these estuaries remain in place to organize and to advance implementation.

The bill also allows, but doesn't require, and that is the important thing, it allows but doesn't require EPA to establish regional offices to carry out the agency's responsibilities in these estuaries.

In addition, the bill directs EPA to create a Long Island Sound Office to coordinate the implementation of the conservation management plan for Long Island Sound.

The Sound, which borders two states and falls in two regions of EPA, clearly needs a central office so that can speak for the Sound as a whole and by working with the management conference, ensure the proper implementation of the management plan.

For a number of reasons that bear directly on coastal protection issues, Long Island Sound is unique among the Nation's estuaries.

For example, 10 percent of the population of the United States resides within 50 miles of Long Island Sound. Studies show that figure will continue to grow over the next 20 years, subjecting the Sound to ever greater ecological strain.

There is a strong need to coordinate state and federal efforts to clean up existing pollution and prepare for future demands placed on the Sound by the surrounding population.

With over 150 city and county jurisdictions involved in activities that affect its water quality, the Long Island Sound needs a unified management effort that sees to it that the requirements of cleaning up the Sound are met.

Earlier in this session, Congressman Morrison and I introduced a free standing Long Island Sound conservancy bill which has the support of a bipartisan group of Members in the House and a host of environmental organizations.

A similar version of the bill has been introduced in the Senate and has the support of all four Senators from New York and Connecticut.

Mr. Chairman, in closing, let me say CDI represents a significant step forward in efforts to address the range of threats to our coastal waters. It's an excellent bill, one that can be made even better with your help.

I urge the subcommittee to act soon on this matter. Coastal resources, such as Long Island Sound, are literally choking from the influx of pollutants, and we cannot afford to let another summer pass by without action.

Mr. Chairman, I believe with your help, we can make great progress. I look forward to working with you on the passage of this bill, and I thank you very much for your consideration this morning.

Mr. NOWAK. Well, thank you very much for your testimony and certainly for all the other work that you have done in this area.

Input such as yours is extremely helpful as we try to fashion a broad program and bring into existence the tools that are going to be necessary to meet this kind of challenge to us.

And we note not only the Merchant Marine initiative, but also the Senate is moving on several of these fronts in a little different manner, but we are also, of course, looking at and reviewing all of their initiatives and hope we can move forward with a bill that takes the best of both, if you will, and adds our own view to what would be the most effective as we go through the review of the Clean Water Act, as well.

Let me turn to my colleague for his questions.

Mr. STANGELAND. I guess I only have one question, Congresswoman Lowey.

You say the bill allows, but does not require, the establishment of the regional offices. However, it does require a regional office in Long Island Sound.

Mrs. LOWEY. Correct. This is a very individual situation, and each particular area would have to make a case for their own office.

Because of the complexity of the Long Island Sound area, there are 150 different entities that have a say in Long Island Sound. Because it's two states that are involved in the protection of the Long Island Sound, we felt it was very important at this time, with the completion of the management plan to have an entity in place so that distinguished study that we all paid for with our tax dollars doesn't sit on a shelf.

And that is why we want to have this in place so that it can carry out the recommendations of the Long Island Sound Task Force.

Mr. STANGELAND. Very good. Thank you.

Mrs. LOWEY. Thank you, Mr. Stangeland.

Mr. NOWAK. Ms. Molinari.

Mrs. MOLINARI. I just again want to also thank my colleague for continuing to bring up a concern which we have addressed at this committee and also to add sympathetic to the concerns of the uniqueness of the Long Island Sound area, some of the beaches that I represent also bear witness to similar problems, and perhaps I will be seeking an amendment to copy your same form.

So thank you.

Mrs. LOWEY. Copy is the best form of flattery, and I thank you very much.

Mr. NOWAK. Thank you very much for your appearance and for taking the time.

Mrs. LOWEY. Thank you very much, Mr. Chairman.

I look forward to working with you and making this an even better and a stronger bill.

Thank you.

Mr. NOWAK. We now want to call before us the representative of the Office of Technology Assessment, Dr. Howard Levenson, who is a Senior Analyst in the Oceans and Environment Program.

Welcome, Dr. Levenson, and the full text of your statement will be incorporated in the record.

TESTIMONY OF HOWARD LEVENSON, SENIOR ANALYST, OCEANS AND ENVIRONMENT PROGRAM, OFFICE OF TECHNOLOGY ASSESSMENT

Mr. LEVENSON. Thank you, Mr. Chairman.

I was the Project Director for OTA 1987 assessment on marine pollution entitled, "Waste In Marine Environments".

The major technical finding of that report was that many U.S. estuaries and coastal waters will continue to degrade in the future or begin to do so—continue to degrade or begin to do so in the future during the next few decades unless we take additional protective measures.

From a policy perspective, the major questions that we raised were whether all "needy" quote, unquote, water bodies will receive the kind of attention that they need and whether existing and planned mechanisms at all governmental levels will be used effectively to provide such management.

Although a number of positive steps have been taken since the OTA report was released, events during the past few years have only confirmed our conclusions. Today what I would like to do very briefly is describe the adequacy of current management efforts and how various legislative provisions might support a more protective approach.

I think, as you heard yesterday, coastal waters, including estuaries, have been used for years, and some people might say abused for waste disposal.

This disposal has been relatively cheap, and it's been often the short-term preferred alternative.

At the same time, one of the things that makes coastal waters unique are their commercial resources, their recreational values, and their ecological roles.

For example, coastal waters provide habitat during critical portions of the life cycles of roughly two-thirds of the fish and shellfish that are caught in U.S. marine waters.

OTA documented numerous adverse effects of waste disposal on these waters. The degree and distribution of those impacts varied widely around the country, but it's fair to say that no region was immune from the facts.

On a national scale, the major sources of pollutants are industrial and municipal pipeline dischargers, combined sewer overflows and runoff from agricultural lands and from urban areas.

I think we also have to look at what might be called nonpolluting activities, things like filling wetlands and channeling and diverting rivers.

These are very much related to the pace of development along our shorelines, and it's this development factor, I think, that is what makes the situation with coastal waters so unique and so precarious.

About three-fourths of the U.S. population is expected to live within 50 miles of a coastline, including the Great Lakes, by the end of the century. And this is simply going to mean much more development along shorelines.

In turn, unless the decisions that are made about development give greater weight to environmental impacts, then we are only going to see undesirable habitat modification, and certainly increased unloading of pollutants into marine waters in virtually every case.

Now, we have two statutes that form the basis for most of our efforts to combat marine pollution: The Marine Protection Research and Sanctuaries Act and the Clean Water Act. I think it's fair to say that the programs under these acts have had some significant suggestions in reducing the amounts of pollutants entering marine waters.

However, even with total compliance with their existing regulations, this will not be sufficient to maintain or improve the health of all coastal waters primarily because current programs don't adequately address runoff, they don't systematically address toxic pollutants, and because, as I mentioned before, urban runoff and legal pipeline discharges are only going to increase, along with increasing development, as with many statutes.

It also could be improved by amending the Clean Water Act to expand controls over a broader range of sources. I think this strategy would help bolster our existing regulatory tools, and it would help correct or prevent problems in some waters. But it still wouldn't be sufficient to protect other areas.

These will require additional forms of management, ones that use perhaps a broader ecosystem oriented approach and ones that consider the entire system that generates pollutants in the first place.

Parts of this strategy include avoiding the generation of waste materials and recycling those materials that are generated. In this regard, particularly with the reduction aspect, effluent fees as proposed in the CDI, could internalize some of the costs of marine disposal and provide an incentive for reducing waste generation.

Even then, I think large amounts of waste are going to continue to be disposed of in coastal waters for the foreseeable future.

And for any given area then, we need to focus on what the most important sources of those pollutants are. The Federal Government and some of the states have developed a few programs that do just this. The Chesapeake Bay program, Puget Sound program, the Long Island Sound program, these basically attempt to bring together parties with vested interests in that particular water body to identify the most important problems and their causes and then to try and develop some kind of long-term management plan to alleviate the problems.

This approach is very promising, but it's still in its infancy, as Congresswoman Lowey testified. It was formally authorized in the form of the National Estuary Program by the Water Quality Act of 1987. However, the process of selecting water bodies for management has been fairly ad hoc.

This is okay in one sense in that we have clearly included the most degraded estuaries and coastal waters in our initial efforts, but we have to question whether water bodies that are likely to degrade in the future are going to get the kind of attention that they need.

So this raises the question of whether we need a more active and systematic national effort to select water bodies and to spur the development of management plans.

I think the CDI bill goes a long way down this path. For example, by requiring states to develop comprehensive coastal water quality programs that would have to be submitted to EPA for approval, it would extend the National Estuary program's authorities by requiring management conferences to be convened and requiring the implementation of conservation and management plans.

And in a fairly new step, it would link the Coastal Zone Management Act with water quality issues, for example, by requiring state coastal management agencies to develop programs to implement nonpoint source pollution control measures.

So I think CDI does go very far in addressing some of these problems. There are provisions in various Senate bills and other bills that could possibly be added to strengthen it, but overall, it goes quite a ways.

In conclusion, I just would like to stress that success in protecting coastal waters is going to take a long-term effort on the order of decades, and it will need to involve all levels of government and the public and private sectors.

We are going to have to place more emphasis on source reduction so that we don't have to worry about pollutants, and we are going to have to make difficult decisions about land use issues and coastal development practices.

Without them, though, the alternative is that our children will probably be inheriting coastal waters that are considerably more degraded than they are at present.

Thank you, Mr. Chairman. That concludes my testimony.

Mr. **Nowak**. Thank you very much. You have provided, I think, a very valuable document in putting this together, Doctor. We will take the liberty of incorporating your major report, I guess it was "Waste In Marine Environments" into the record following your testimony.

And looking at the conclusions that you have reached after addressing all of the areas you have, you have identified, of course, the main additional sources that will have to be looked at and corrected to some degree.

What we are trying to do is do that in a coordinated fashion and bring together those things that you have mentioned. Certainly in the Senate bill, there are various initiatives which are somewhat stronger in certain areas than the Merchant Marine bill. But we probably will have questions to you to try to distinguish between some of the initiatives in both those theses.

When we talk about the combined sewer overflow, taking that as one of the aspects, the dollar amounts that we are receiving as far as costs are concerned to promote the separation are running, in terms of dollars, almost twice what we have spent from the inception of the Clean Water Act to the end of it this year.

That has some people, especially in the Administration, very nervous about any kind of program, and yet we have the mayors that are charged with the responsibilities of trying to fulfill the mandates and clean up their waters in a very precarious position.

Congressman Gerry Studd's initiation would try to breach, or fill the gap, I guess you would say, in funding items by putting into effect a fee system.

And the question I guess we are going to have to really look at is how much of a fee is going to discourage usage into a sewer treatment plant, and what—and where we should be attacking, you know, in any particular district, which brings in the flexibility I think that you have agreed with that we have to give the areas in order to obtain that overall achievement of sufficient and meaningful reduction.

Do you know or have you thought through the process of any other unique ways to—incentives for a fee or for a revenue enhancement, if you will?

Mr. **Levenson**. The one idea that has come to us is some kind of fee, some kind of effluent or discharge fee.

I think there are two things to consider about a fee. One is it can be used at whatever level it's set at to create—to generate revenues for various kinds of programs, including, for example, correction of CSO, so that would be one possibility.

The other aspect is whether we will actually discourage, for example, industrial users from discharging into either a sewer system or into a river or an estuary.

Unfortunately, I have seen no analysis of what level would be required to have the industrial dischargers actually make a different decision. This is true of all kinds of waste taxes or fees.

It's a good idea conceptually to internalize the cost, but we generally don't know what level to set it at.

Mr. **Nowak**. Would enhanced pretreatment technology be of some value in this whole area? How can we put together an incentive to upgrade the pretreatment so that the effluent doesn't get into it, even if it's going to a sewer treatment plant, which is another disposal problem, which is now being looked at to everything from land fill to incineration, which brings on other problems.

Mr. **Levenson**. Right. Well, pretreatment is critical. Clearly, a lot of the toxic metals, heavy metals and organic metals, in marine waters come from industrial discharges, either through the sewer system or come from runoff in many cases.

The pretreatment program has taken a long time to be implemented. It is still in it's early stages, really, of being forced, and I think that in this case, we need to have much more enforcement on the part of EPA through the discharge permits that are given to sewer treatment plants.

Because the pretreatment program is directed towards those industries that discharge into sewers, and it's up to the sewer treatment plan or whoever is the authority for that plant to make sure that the industries are complying with EPA's regulations.

In turn, the sewage treatment plant has a discharge permit, and that is where EPA can enforce probably more vigorously.

If EPA requires the sewage treatment plants to meet their discharge permits, then they in turn will have to talk to the industries. There is a conflict here because the industries also pay fees to use the sewer system, so it's tough for the localities unless they have somebody from above that they can point to.

Mr. **Nowak**. The other perhaps multi-approach that we would like to put into effect is are the communities that you just mentioned in the various systems that are all contributing, and I note in the one that the Long Island you have many different municipalities that have to be coordinated.

I am wondering if we can put together an incentive that could bring these differing problems and discharges into one large ecoregion as you have used in your testimony.

How do we do that?

Mr. **Levenson**. Well, I think we have made some progress on that. The Long Island management plans that are being developed go quite a ways in identifying various provisions that people, localities and farmers and what not need to take.

The problem is, as Congresswoman Lowey identified, is that there is no requirement to implement the suggested measures, and I see really no other alternatives other than provide funding in some way so that there is no squabbling about implementing something or just simply require that it's implemented.

I think we have to face the fact that improving coastal water quality is going to be very expensive. Certainly, we want to ease the burden on municipalities in some way, and that is where the effluent fee might be able to help.

But there are no good alternatives that I see to spending more money to solve these problems.

Mr. **Nowak**. I guess the question is, who pays and how can you generate sufficient—if we have a matching program, if we have some incentive, if the communities can agree on the priorities solutions for their "economic region" to solve their problem, besides the fees that are going into the program if we dumped that basic system. The Federal contribution in reading this, it's about 80 percent of the dollars which would stay in the localities under that fee system which probably wouldn't be enough to implement any of the plans.

So you would have to have some type of regional addition, either through the sewer fee or through a water charge in addition to what is already being collected.

But that system is in place, and does it make any sense that those that are using the water system and paying the local fee on sewer and water charges would have to provide an additional way to enhance the total fund?

Mr. **Levenson**. Of course it's always a philosophical question of how many more funds you want to impose on somebody, but it's true that the users of the system are paying the operating costs of the system, but they are not paying the environmental cost of that system when it discharges into coastal waters.

So in one sense, imposing an additional fee on various users could be justified simply as a way of internalizing environmental costs.

That is again a choice that has to be made. I would say that the effluent fee in the CDI bill, I believe applies only to industrial dischargers. I would have to check that.

But there are other possibility equally difficult. For example, if runoff is the major factor contributing to pollutants in an area, perhaps we need to think about ways to internalize those costs on farms or our street surfaces, which would go back to the city.

That is an even tougher issue, but we have to deal with the nonpoint source problem in many areas, as well. It's not just industry that has to be given blame.

Mr. **Nowak**. Thank you very much.

Ms. Molinari.

Ms. **Molinari**. Thank you, Mr. Chairman.

Thank you, Doctor, for your very thorough and insightful analysis of this incredibly complex problem that we are facing throughout this Nation.

I just want a point of clarification with regard to your perspective on one aspect of the CDI proposal.

Did you say you were endorsing the fine structure, a penalty structure?

Mr. **Levenson**. Well, we haven't endorsed it, but it seems like it's a good idea for internalizing those costs and for providing some kind of revenues.

As a general concept, yes. The details, we haven't looked at.

Ms. Molinari. Okay.

But then carrying that from some other statements that you have made, it would seem to me that if we are going to go into a forceful fine structure, in order to make that work, and back up with what you have said, one of the first things that we would need to do would be to increase our enforcement agents in this area.

Mr. Levenson. We clearly need to enforce various water programs, yes.

Ms. Molinari. You mentioned with regard to one, checking the discharge permit. What are some of the other areas that we need to increase the enforcement from your perspective?

Mr. Levenson. Discharge permits are the main area because that is our main vehicle. But it does require EPA looking at a variety of different kinds of discharge permits.

There are the directors charge permits that a sewage treatment plant has and that an industry would have, but then there is also the pretreatment program that the Chairman was talking about which is a little more nebulous, I guess, in terms of enforcement because you have to go through the locality.

But those are the major areas at this point where we have permits that have to be complied with.

Nonpoint source runoff in general, we do not have permits with discharge limits or anything like that, so there is nothing to enforce against.

Ms. Molinari. Okay. Thank you.

Mr. Nowak. Dennis Hastert from Illinois.

Mr. Hastert. Thank you, Mr. Chairman.

In listening to your testimony, Dr. Levenson, I question, I just wonder, you know, we passed the Clean Water Act in 1987. Your study was done in 1987. To what extent did you factor in that Act in your study, or has it had an effect?

Mr. Levenson. We did try to factor that in. Of course, it was a little—we couldn't tell how well it was going to be implemented.

I think what I would say today about the Water Quality Act of 1987 is that it did set up kind of the embryonic stages of some of the things we are talking about, the National Estuary Program, and it's certainly had provisions for nonpoint source control programs, although those were authorized, but the appropriations were never supplied to EPA to implement those provisions.

It did not go very far though, understandably, since it's dealing with the Clean Water Act in dealing with coastal zone management issues.

So it did some things. I think that there were other issues that it could not look at at the time.

Mr. Hastert. As a matter of fact, a lot of the things in that Act basically authorized most, if not all, of the mechanisms recommended in your report.

Mr. Levenson. That is true.

Mr. Hastert. The funding is the problem, so I mean that is in law.

If you can, could you explain how well coastal areas, that is the estuarian and marine waters are doing in meeting water quality standards or designated uses under the Clean Water Act?

How are things shaping up? Where are the problems at?

Mr. Levenson. That is a very good question. One of the problems that we identified was that we lack marine water quality criteria for most areas of the country. We have water quality criteria for most—and designated use for most fresh water areas in the country, probably all of them if I am not mistaken.

Mr. Hastert. Would the gentleman yield then for a second?

You are saying the river and lakes do have water quality standards that you can measure against, and salt water areas that don't?

Mr. Levenson. For the most part. The way the system works is that EPA is supposed to develop criteria or guidelines, and then the states are supposed to adopt standards based on those criteria.

EPA has developed criteria for rivers and lakes, and the states have done a pretty good job of adopting those as standards. Those standards are then incorporated in various permits issued by the states.

In the marine coastal situation though, EPA has issued very few or relatively few criteria for metals and synthetic organic chemicals, so there has been nothing available for the states to use to develop standards.

This is an issue that needs to be—we haven't looked at it recently, but it certainly was a big problem at the time. And I think it still is.

Mr. Hastert. I don't want to put words in your mouth, but I want to clarify this. You are saying that fresh water areas, rivers and lakes, are doing a better job of meeting those standards than salt water areas?

Mr. Levenson. Oh, I see. We have not done a real comparison of how well they are meeting the actual standards. We just looked at what the availability of the standards was.

So I am afraid I cannot answer that question.

Mr. Hastert. Okay.

That is something that is interesting to many of us. And we want to just—if you start to look at just salt water estuaries and marshes in comparison, were we doing a better job, or were we falling down, or were our resources lacking?

Can you—do you care to comment on that?

Mr. Levenson. Well, I think in general, the perception that I have and that others have is that fresh water environments have done—have improved in the past.

The geological survey has a network for monitoring water quality, and it has shown improvements over the last decade or so.

There are many areas, though, that are still falling far below their water quality standards and uses.

The situation though in the coastal waters is, I think, much probably and order of magnitude worse in a sense. There is just many, many more things going into those waters and fewer controls.

Mr. Hastert. So I guess I am driving at an issue of pristene standards in a sense, too. You know, the midwest where I come from and certainly an area where the Chairman comes from, we depend on lake water for drinking water supplies where you don't depend on ocean water necessarily for those types of supplies.

Just what are those standards? I mean, are we driving toward that, that we can start to set up those standards, and what is the relative importance?

Mr. **Levenson**. In the coastal areas?

Mr. **Hastert**. Yes.

Mr. **Levenson**. Well, I think we certainly have made a lot of progress in lake water quality and river water quality, some of the biggest, most famous success stories, Lake Washington and Lake Erie, and so on.

Those are certainly improved, and we have spent a lot of money on that.

I think we are at the point where in the coastal waters we can set up what might be called traditional water quality criteria for things like suspended solids, oxygen demands, some of the metals.

The CDI bill would extend this concept by requiring EPA to develop sediment quality criteria, which is also an issue we raised in our report.

That will take a long time. We are not at that point yet, but we can progress there more rapidly than we are right now.

Mr. **Hastert**. Thank you very much.

Thank you, Mr. Chairman.

Mr. **Levenson**. Thank you.

Mr. **Nowak**. Thank you, Doctor.

We have your conclusions and observations, and I think they have been very helpful, especially the general conclusion that without additional measures, we are losing this battle. And it's only progressively going to get worse, especially when you consider the growth and the development that has taken place. And it looks like in our coastal areas we will have more and more impacts as we have population growth.

And the other observation that you made, I think, is one that is not understood, the cost to the environment is not taken into consideration by the water and sewer bills that people pay, and it was brought to my attention also when we buy a can of hair spray with chlorofluerocarbons in them and use that hair spray, that $2 cost doesn't cover the damage that is supposed to be out in the atmosphere after you use the hair spray, which in one environmental assessment was to cost $25,000.

I am sure that hair spray would not have been sold if it cost $25,000. Hopefully we can start to look at the overall impacts as well I'm sure in other areas when these kinds of analyses are made and they are credible.

So again, thank you very much for all the work you have done, and we look forward to working with you, and we hope that you will be available for some other perhaps questions and even some other meetings with us as we move forward on this measure.

Mr. **Levenson**. Thank you, Mr. Chairman. I will certainly be happy to try and help you as much as possible.

Mr. **Nowak**. Good. Thank you.

[Mr. Levenson's prepared statement appears on p. 284.]

Mr. **Nowak**. I would now like to bring before the subcommittee three environmental organizations.

First, the National Resource Defense Council, represented by Jessica Landman, who is a Senior Attorney with that organization;

the Friends of the Earth Environmental Policy Institute, the Oceanic Society, J. Charles Fox, who is the Director of Legislative Affairs; and from the Environmental Defense Fund, Dr. Rodney Fujita, is that right, Doctor, who is a marine ecologist with that organization.

And we want to welcome you before the committee, and all of these organizations have done extensive work, not only this year on this matter, but were many committed sustained years in the past.

So we welcome all of you before our committee, and let me now turn to Jessica Landman for her testimony.

TESTIMONY OF JESSICA LANDMAN, SENIOR ATTORNEY, NATURAL RESOURCES DEFENSE COUNCIL; J. CHARLES FOX, DIRECTOR OF LEGISLATIVE AFFAIRS, FRIENDS OF THE EARTH, ENVIRONMENTAL POLICY INSTITUTE AND OCEANIC SOCIETY; AND RODNEY M. FUJITA, MARINE ECOLOGIST, ENVIRONMENTAL DEFENSE FUND

Ms. **Landman**. Thank you, Mr. Chairman.

I appreciate this opportunity to testify about coastal pollution problems and possible solutions to those problems.

I do work for the National Resources Defense Council, but today I am here to speak for several other organizations, as well, who share our concerns about coastal pollution: the National Wildlife Federation, the Coast Alliance, the Environmental Defense Fund, and the American Oceans Campaign.

I would like to summarize my written testimony and ask that my full testimony be included in the record.

Mr. **Nowak**. Without objection, so ordered.

Ms. **Landman**. Mr. Chairman, our marine and Great Lakes coast are beset with water quality problems and with related effects such as contaminated sediments and endangered wildlife.

They are traceable to the very high and still growing population density of coastal areas. This subcommittee already has heard extensive testimony on the scope and sources of degradation, so I will recap those issues very briefly and then turn to our suggestions and recommendations.

First of all, poison runoff from farms, construction sites and urban areas, city streets carry both toxic pollutants such as heavy metals and pesticides and excess nutrients in the surface waters.

I brought with me today copies of NRDCs "Poison Index for the City of Baltimore." We have made some calculations based on information from EPA's national urban runoff programs which enable us to compare the quantities of toxic and nutrients reaching Baltimore's harbor from urban runoff and compared them to the quantities of toxics and so forth reaching those waters from direct dischargers, factories and sewage treatment plants.

Our results indicate that urban runoff rifles factories and sewage treatment plants as sources of both toxic metals and nutrients to Baltimore Harbor. Point source discharges also from factories and sewage treatment plants, of course, do continue to be major sources of contamination, and it's estimated that 8.6 trillion gallons a year from waste water facilities are still discharged into marine waters.

As you know, combined sewer overflows also play a major role in coastal degradation and in beach closures. It's estimated that in 1989, there were over 575 beach closures in New York, New Jersey, and Connecticut alone due to sewage contamination from combined sewer overflows and other sources of untreated sewage.

Contaminated sediments are the legacy of these many sources of degradation. Our major harbors and estuaries are underlined with a poisonous carpet of PCBS, PAHS, DDT, heavy metals and other contaminants.

These toxics come from the many sources I have already noted, poison runoff, point source discharge and combined sewer overflows.

We have a three-fold challenge when it comes to contaminated sediments. First, how do we measure that contamination, and how do we evaluate clean up of sights?

Second, what do we do with the contaminated dredged spoils and in-place sediments today; and finally, how do we change current practices so that we do not have more contaminated materials tomorrow?

In other words, how are we going to prevent further pollution of sediments to end the cycle of contamination, dredging and dumping.

Mr. Chairman, we believe that legislative action to restore and protect our coastal waters is needed this year. This subcommittee has before it H.R. 2647, the Coastal Defense Initiative. The CDI does take an aim at some of the gaps in current coastal protection law and would, we believe, greatly advance our coastal protection agenda.

We urge you to act on this bill, but in the process, we also urge you to strengthen it by addressing some of the areas of concern that are not now covered by the current draft of the CDI.

I would like to turn for a moment to one other question that people have raised, the question of whether it's appropriate to revise the Clean Water Act to add sections that focus only on the coast.

We think that it's appropriate, Mr. Chairman. First, as a whole, our coastal waters are in more immediate danger than our inland waters due to population pressures and to the fact that the water that falls inland continues to flow down hill with all of its contaminant load to the Great Lakes and our estuaries and oceans so that inland pollution becomes a coastal problem.

Second, we think that success in protecting our coastal waters can be applied readily to inland waters in future years. If these programs turn out to have the promise that we now foresee that they could have, in the next Clean Water Act reauthorization cycle, we would hope to extend the protections to all waters.

There are a number of significant provisions in the CDI that we would like to see merge from this committee, and there are other areas which currently are not covered but which deserve your attention.

Some of the key issues we believe, or the most significant, are first, using the law to link land use to coastal water quality more effectively.

The CDI requires the states to develop comprehensive coastal water quality programs through coordination between coastal zone management agencies and water quality agencies.

This would forge a vital link in water quality protection. Furthermore, the bill would require EPA to develop guidance and technology assistance on pollution control measures, in effect, technology based standards modeled on the technology based standards for point sources, only this time for nonpoint sources.

Those BMPs would be implemented in the degraded and threatened coastal waters. We think these steps are very important ones and we urge you to support them.

In addition, we urge you to consider adopting language contained in Senator Lautenberg's bill that targets conservation reserve program dollars on farms that have a severe water quality impact.

It is also critical that we strengthen water quality and sediment quality criteria and standards. This subcommittee has heard a great deal of testimony about the need to strengthen water quality criteria and to strengthen state water quality standards.

We need to improve EPA's record of developing water quality and sediment quality criteria. We urge your support for the poison in CDI that is aimed at this problem, but we also ask you to go further by mandating the development of sediment quality criteria for key coastal sediment contaminants by a date certain.

EPA needs to direct additional resources to this effort, and they need to hear from the Congress that that is what they ought to do.

We also urge to consider legislation that will eliminate CSO discharges of untreated effluent. In the reauthorization hearings that this committee held several weeks ago, a great deal of testimony about the CSO problem was heard, both about the price we pay in terms of polluted beaches and contaminated seafood and the cost of clean up.

The CDI does not contain a CSO provision, but legislation is badly needed in this area. We urge this committee to build on the bills that are proposed in the Senate and to adopt a specific time table for identifying and for eliminating untreated CSO Discharges.

Next, we think it's time that this committee consider eliminating the 301H waiver. The concept that our coastal waters can assimilate waste has been discredited in the last decade.

The OTA report contributes to our understanding of the degree to which cumulative impacts on coastal waters are causing degradation. The time has come to eliminate the less than secondary waivering in 301H, which is both environmentally unacceptable and very difficult for EPA to administer.

We urge you to adopt language that would phase out the availability of the waiver as part of your coastal protection package.

Finally, it's time that we address contaminated sediment problems. We badly need a national program that will clean up sites that have sediment contamination and will prevent further contamination.

We urge you to consider legislation that would create a national task force to survey contamination sites and to focal point for the clean up of sediment and the development of sound sediment quality criteria.

We also urge you to consider establishing a demonstration program to test new remediation techniques in place in coastal waters.

And finally and most important, we urge you to consider legislation that would phase out the disposal of contaminated sediments in coastal waters, along with the national pollution prevention program, to end the continuing deposition of contaminated materials in those coastal waters.

In conclusion, Mr. Chairman, the coastal protection agenda is a very busy and full one. This committee has no time to lose. We look forward to working with you towards the ambitious goals I have talked about here today.

Thank you. I will be happy to answer any questions, and I would also be happy to leave with the committee copies of NCD's "Actions for Cleaning Up Coastal Waters."

Mr. NOWAK. I would like to—we will also incorporate that into the record following your testimony so that it completes the record.

Let me now turn to Mr. J. Charles Fox.

Mr. FOX. Thank you, Mr. Chairman.

Members of the committee, my testimony today will not address any of the issues that have been put forth in any of the bills pending before this committee or other committees here in Congress. Instead, I want to talk about what I believe to be one of the biggest threats to coastal environments. It is a threat which frankly has gone basically unaddressed in all the proposals that have been introduced to date. The issue is growth and development in coastal waters.

Let me start by telling a story. This weekend I was down at Ocean City, Maryland, at a conference with some citizens down there and got led around by a merchant from Ocean City. This merchant showed me at 8:00 a.m. first this site of a 300-acre clear cut that was right on the shore of the back bay of Ocean City, Maryland. It was right adjacent to a wetland, and it was clearly an example of inappropriate development.

I later actually talked to the developer, and the developer agreed that it was inappropriate development, but he told me that the county council had zoned this for this development and that in fact the blame rests with the council, so we both agreed in our pointing the fingers at the blame.

The more interesting thing that I learned this weekend from talking with this merchant was that he has been trying to compile records on the amount of growth and development that is happening in Ocean City, Maryland, and he approached the county to find out this information, and in fact the only completed list of all the different proposals that were pending was a fundraising list that the county commissioners had created for purposes of raising money.

The issue here is one that in Ocean City, Maryland, they have in applications pending enough development projects to basically double the size of Ocean City, Maryland. This is on the back bay of Ocean City. As some of you may know, we are talking about a barrier island, I am talking about the back bays now. We are talking about a population growth in the back bays of doubling the population of Ocean City.

The issue for coastal environments is one of cumulative impacts of growth and development. Any one single project may only increase pollutant loads by a small amount or it might only result in a relatively minor loss of important habitat, but the unfortunate truth is that when you add all those things together you get dramatic declines in coastal ecosystems.

I know the Chairman is a fisherman and I think the example of fishing is something that is appropriate. When you look at the coastal fisheries and the declines that have happened there in the last ten years, it is truly phenomenol what is going on. This is in the most part not the result of one single factor, one single pollutant or one single smoking gun. In fact, it is the result of loss of habitat, increased pollution loads, and overdependency on the resources.

What to do about all this problem? This is an issue clearly that has historically been left to Federal and state government. The existing program we have at the Federal level right now is the Coastal Zone Management Act. It has been around for 18 years, since 1972. I think it is fair to say that it has not adequately protected our nation's coasts from growth and development. It has not adequately reflected in our view the Federal interest in this resources.

So the question becomes what is an appropriate Federal role, and I appreciate that these comments are somewhat controversial, but I would urge this committee to consider a new Federal role in coastal growth and development, one that would take the form of requiring certain growth management programs to happen at the state level.

This has happened increasingly at the state level, absent any Federal leadership. The State of Maryland adopted a fairly radical Critical Areas Commission, New Jersey tried to advance a proposal. There is a moratorium now in Cape Cod. Other states that have adopted comprehensive growth planning include Maine, Florida, Georgia, Rhode Island, the state of Washington, just to name a few.

The time has come, we believe, for the Federal Government to start guiding some of these growth management programs to protect its interests in the coasts.

In conclusion, let me just say that we are not advocating that the Federal Government become involved in local land use decisions. Rather, we ask that the Federal Government establish some minimum criteria from which state programs can be guided. Despite our agreement that these concepts are somewhat controversial, we are led to the conclusion that without effective programs to control growth and development, improvements in coastal ecosystems will be short-lived if they occur at all.

Thank you, Mr. Chairman.

Mr. **Nowak**. Thank you very much, Mr. Fox.

Before we get into questions, let's hear Dr. Fujita's testimony. Doctor, if you will present your testimony, we will incorporate your statement, of course, in the record.

Mr. **Fujita**. Thank you very much, Mr. Chairman, Members.

My name is Rodney M. Fujita. I have a doctorate in marine ecology and am currently a staff scientist with the Environmental Defense Fund. I have conducted some research on the response of Florida's coral reefs to nutrient loading and am currently studying the sources of nutrients to the Florida reef tract, the impacts of land-based pollution on the reef tract, and ways to reduce threats to the health of coral reefs.

In addition, my colleagues and I are studying the impacts of global climate change on coral reefs throughout the world, in particular, the stimulation of coral bleaching by increased water temperature and other stresses, and the impacts that widespread bleaching may have on the greenhouse effects.

I thank you for this opportunity to comment on environmental problems threatening the vitality of coral reefs. I would note that in addressing the problem of coastal pollution, it is imperative that the subcommittee address the continuous and serious degradation being suffered by the coral reefs, which are a national resource, and interconnected nearshore ecosystems of South Florida, this country's most important reef tract.

Clearly, physical damage from a variety of activities is a serious threat to coral reefs. Three major ship groundings occurred within two months last year in the Florida Reef Tract. Damage from ship groundings, anchor damage, and physical disturbance from divers and snorkelers causes species composition to change and, in some cases, allows algae to dominate reefs. This kind of damage is very deleterious on time scales of a few years to a decade or so.

In the absence of other stresses, coral reefs have been subjected to hurricanes every six years or so for the last 10,000 years up until 1965. While until recently, the reefs have been able to recover from natural and human induced physical disturbance, it is important to realize that these recoveries occurred when water quality was much higher than it is today.

It is important to note that, at present, in addition to physical disturbance, Florida's coral reefs face many stresses which may decrease their ability to recover from physical disturbance and which, if allowed to continue, may result in gross alterations or the complete demise of the reefs. These stresses range from those resulting from local land use and water management, such as siltation and nutrient loading, to stresses related to regional and global environmental problems.

First, let us consider the local and regional threats. South Florida is the site of extensive agriculture, with associated pesticide and nutrient loadings to ground and surface waters. Recently, pesticide residues have been discovered in coral tissues several miles offshore from the land in the Florida Reef Tract within the boundaries of John Pennekamp Coral Reef State Park.

Although the source of these pesticides is not yet clear, it seems likely that they originated in agricultural areas to the north of the Keys. Insecticides applied on land in the Keys to render them habitable may also eventually accumulate in the reefs as well as in interconnected ecosystems such as seagrass meadows and mangrove swamps.

Urban centers in South Florida and dense development in the Keys are likely sources of the increased nutrient levels found in the waters supporting these coral reefs. Millions of people live in coastal areas from Palm Beach to Miami. They discharge hundreds of millions of gallons of sewage and partially treated septage to marine waters. Much of this effluent travels south to the coral reef tract.

Coral reefs in South Florida, like coral reefs around the world, thrive in low-nutrient waters. Experimental evidence indicates that elevated nutrient loading, especially of phosphorus, increases the productivity of algae that are normally kept in check by grazing fishes and invertebrates.

Excessive nutrient loading has led to extensive algal blooms in Bermuda and to the complete degradation of coral reefs in Kaneohe Bay, Hawaii. Recently, a patch of branching and soft corals was discovered near Grecian Rocks in the Key Largo National Marine Sanctuary that is severely overgrown with filamentous algae.

I brought with me some photographs taken at this site. This is a coral reef typical of the Key Largo National Marine Sanctuary with fairly high water quality offshore. This is a picture taken last August of the same type of reef 2½ miles offshore, which clearly shows gross overgrowth of the soft coral there in the foreground and the hard coral with the blue-green filamentous algae. This is very symptomatic of extreme nutrient loading, and we don't know what the source of the nutrients are yet, and we are trying to develop that information.

No significant tertiary treatment of septage, which would remove inorganic nutrients, occurs in the region. In addition, most septage in the Keys is treated with septic tanks. Many studies have shown that the combination of porous carbonate soils overlying porous fossil reef limestone, the limited ability of these soils to remove nutrients, high water tables, seasonally heavy rainfall, and proximity of development to canals and embayments makes the Keys eminently unsuitable for septic tanks and results in a large amount of nutrient loading to adjacent waters.

In addition, current plans for a secondary sewage system for areas in the Keys appear to be inadequate. The construction of a centralized collection system and secondary treatment plant will increase the potential for development and accompanying deleterious environmental impacts unless measures to restrict capacity are implemented and strictly enforced.

Furthermore, a secondary treatment facility would do little to reduce nutrient loading to adjacent waters surrounding Florida's coral reefs. More appropriate technologies and management strategies exist and should be fully explored if the threat of excessive nutrient loading is to be redressed.

In addition to excessive nutrient and toxin loadings, Florida's coral reefs have proven to be susceptible to changes in temperature. Increased temperature appears to cause corals to expel their photosynthetic symbiotic algae, decrease their photosynthetic pigment content, or both. This is termed "bleaching." Bleaching greatly reduces the coral's ability to secrete limestone skeletal material that is crucial for protection from predators, production of sediment, and growth of the reef framework.

Three mass bleaching events in coral reefs around the world have occurred during this decade, the warmest bleaching in 1983, when water temperatures were unusually high. There are not indications as yet of mass bleaching events before 1979. If increased temperature does induce bleaching, bleaching events may become more frequent and more intense as global warming proceeds. Indeed, coral reefs may be the first ecosystems on earth to show the effects of global warming due to the greenhouse effect.

Siltations from poor land use, dredging, or offshore drilling also results in bleaching. In all likelihood, nutrient loading, siltation, toxin accumulation, physical disturbance, increased ultraviolet radiation resulting from ozone depletion, and increased temperatures interact synergistically, enhanced the likelihood of bleaching and perhaps of the coral and seagrass diseases that have had devastating impacts on coral reef and seagrass ecosystems throughout the Caribbean.

Stresses imposed on Florida's reefs from global warming and ozone depletion are, to a large extent, beyond local control. These threats should provide further motivation to reduce local stresses so as to permit coral reefs to adapt to global changes already in the pipeline.

Clearly, Florida's coral reefs are threatened by more than ship groundings. While historically they have recovered from physical damage, the current degradation of water quality and other ecological disruptions could doom the reefs. Coral reefs do not appear to be capable of adapting to high nutrient loadings, disruption of food webs, or increased temperatures.

Water quality has declined in the region under consideration for designation as the Florida Keys National Marine Sanctuary—this is being considered in a bill introduced by Representative Fascell and also in the Senate by Senator Bob Graham—despite the designation of these waters as "Outstanding Florida Waters" and the establishment of the Key Largo and Looe Key Marine Sanctuaries, John Pennekamp State Park, Biscayne National Park, and the Fort Jefferson Dry Tortugas National Monument.

Obviously, more comprehensive protection, specifically legislation, that includes the regulation of land-based activities that impact water quality is needed. It is also possible that atmospheric deposition of nitrate originating from nitrogen oxide emissions from cars, power plants, and incinerators could be adversely affecting water quality. We have shown this to be the case in the Chesapeake Bay.

A comprehensive management plan that identifies all threats to coral reefs including atmospheric and terrestrial sources of nutrients and toxins, should be developed. The plan should include at the minimum the following elements.

One, the development of special water quality criteria for waters containing coral reefs. Existing marine water quality criteria do not adequately protect coral reefs from excessive nutrient loading and other stresses. Florida's coral reefs appear to be already stressed by excessive nutrient loading. We don't know how nutrients and other stresses interact to affect coral reefs.

It is unlikely that the capacity of coral reefs to assimilate nutrients without changes in species composition and other detrimental effects can be determined before the reefs are irreversibly damaged. Therefore, it is important to adopt a policy of risk aversion and require that no more nutrients from human activities be allowed to accumulate in sediments, biomass, or the water column.

Natural sources of nutrients from groundwater and surface waters, atmospheric deposition, advection from deep and offshore waters, and nitrogen fixation and natural pool sizes of nutrients should be quantified using historical data and data from pristine coral reef systems in the Caribbean. This could serve as the baseline "criterion." Actions to reduce nutrient loadings would be triggered when these natural loadings and pool sizes are exceeded.

Two, an environmental monitoring program should be established in the Sanctuary to detect deviations from the pristine baseline described above and to determine the sources of nutrients, silt and toxins so that these loadings can be eliminated.

This may be facilitated by the establishment of a Geographical Information System for the Keys, South Florida, and the reef tract coupled with a hydrological model and a circulation model. Remote sensing and tracer studies may also be required.

Three, the environmental monitoring program should include routine temperature, salinity, and ultraviolet radiation measurements to track the progress of global warming and ozone depletion. Studies on the interaction between temperature, salinity, ultraviolet, and other stresses on coral bleaching, as well as on other metabolic and ecological processes, should also be conducted.

However, actions to decrease known stresses should not depend on the results of this research. I have attached an outline for an environmental monitoring and research plan to this testimony.

Four, provisions are needed to enhance coordination between Federal, state, and local authorities, as we have heard from many of the speakers this morning, to ensure the protection of Florida's coral reefs and adjacent seagrass meadows and mangrove swamps. Because land use strongly influences water quality, this coordination must include land-based activities.

The need for increased coordination of agencies and for strong enforcement of regulations designed to protect Florida's reefs is obvious in light of the failure, in large measure, of previous attempts to protect these ecosystems from physical damage and water quality degradation.

Five, adequate funding and authority should be provided to support environmental monitoring, research, and implementation of management strategies. Past attempts to protect Florida's reefs have been thwarted by local pressures to develop the Keys and tourist activities without any regard to protecting water quality.

Thank you for considering my comments. I hope they are helpful in your efforts to identify issues associated with coastal pollution and to protect our nation's most important reef tract. These reefs are an invaluable national resource and support one of the most biologically diverse and beautiful ecosystems on earth. Consequently, a national effort to protect them is required.

Comprehensive legislation and rigorous enforcement of regulations that take into account all threats to coral reefs, seagrass meadows, and mangrove swamps, which form an integrated, interdependent ecological complex, are needed to ensure their continued existence and viability.

Finally, lessons learned in protecting these critical ecosystems will certainly have value when dealing with more general issues of coastal pollution throughout the nation.

That concludes my testimony. Thank you very much.

Mr. **Nowak**. Thank you very much, Doctor. We have received testimony that I think overall paints a true picture of where we are in looking at some of the problems that you raise, the very practical one of that zoning in Ocean City, and I would think the problems that the doctor was just describing relating to coral reefs as a result of that over the past 30 years.

Also when you talk about the nutrient loading, there is a project going on now to review the Lake Okeechobee, which is probably 80, 90 miles away from the coral reefs that you mentioned, but yet if the canal system is correctly bringing that nutrient load from the farming communities up in Lake Okeechobee through the canal system, when you had your rain there last month and everything overflowed, even though your drought in southern Florida was not curtailed by that rain because the rain just want through your canal system and spilled out in the ocean.

And I am sure the portion of it that flowed down through the canal system entered into the Miami River, the Miami River entered into your John Pennekamp Park reef area, and that has been going on for an awful long time.

So until you start to correct some of those loadings in the central part, and I am sure you are going to go see those farmers and tell them not to use any more enhancements for their crops, but until you do that you are probably going to have, you know, abnormal rates of phosphorus coming down. That seemed to be the problem with the Everglades in the other loadings that they have had coming from the same source up in that system.

But the growth and development is one thing, and I think when Dr. Levenson made the points of the increased population growth in our coastal areas, it really covered many of those—the results of that are happening, and you pointed out I think very well in your testimony at least some interim steps we should be looking at in order to at least enhance the view.

I think one of the broader elements that was stated over and over in the hearings is really the lack of our ability to pay the environmental costs of our water and sewer and our zoning laws and putting those amounts of stress, if you will, on the estuaries that are all on the coastal areas, so I think all your testimony is going to help us.

We are certainly going to look at some of those suggestions you made, and as you pointed out, we have some initiatives in the Senate that have been advocated by various groups and people since the OTA report came out, in fact much before that, but at least we have got more documentation now on which to act from. And I don't know, you know, how we look at the coastal zone management bill and how that can play a role in all of this, too, because of the dollars that are going to address some impacts on those coastal areas.

One that has got to be looked at is what kind of population and the effect that population is going to have. You start cleaning up bottom sediment, for example, and you are letting loadings come in or being exceeded because you are going to have heavier population loads, you are not going to solve those problems in any term that is going to make real progress.

But we will be looking at all these alternatives.

Let me turn now to Dennis Hastert for any comments or questions he would like to make at this time.

Mr. HASTERT. Thank you, Mr. Chairman.

Dr. Fujita, your testimony I think was enlightening. What do you suggest? Do you suggest national—I mean, the ecosystem and the coral reef system in Florida is one thing. Do you see national legislation to protect all such off-coast ecosystems?

Mr. FUJITA. Throughout the world, do you mean?

Mr. HASTERT. No, our jurisdiction doesn't go that far, but at least national.

Mr. FUJITA. Well, one thing to consider is the Coastal Zone Management Act is one tool that can be used to influence and protect offshore ecosystems, but another way to do it is to focus on what kind of subsidies are being provided to development in coastal areas, and the Keys have been designated as a barrier, even though they are not classically defined as a barrier island, and so that might make them sites at which the Federal Government cannot provide subsidies like flood insurance and so forth. That may inhibit development.

I think there are some opportunities, including these bills that have been recently introduced to designate the entire Florida Reef Tract as a national marine sanctuary, but we know from experience that that sanctuary legislation does not fully protect water quality because, as many of us have said over and over again, they don't include authority or influence or land use, and that has turned out to be the major source of pollutants degrading water quality in the area.

Mr. HASTERT. So basically with a great influx of population to Florida, and we see it here, the population, we are approaching the census, the tremendous growth that area has had, you have got to do something with the people, and part of that is the sewage effluent, and that is part of the problem; is that correct?

Mr. FUJITA. That is much of the problem.

Mr. HASTERT. So, people, we need to make the message that they shouldn't seek the sunshine. I am not sure that we will get that done. Let me ask you another question to follow that up, though.

You said there is a lot of phosphates, a lot of phosphorus in the water. Is that because of agricultural usage or is that because of the mining that goes on in Florida of phosphates?

Mr. FUJITA. Well, I can't say with certainty yet because we are still in the midst of studies of trying to determine where those nutrient loadings are coming from. The Keys are currently considering a phosphate ban on detergents which will be helpful, I think. It is clear that a certain amount of those phosphates are coming directly from septic tanks, not from agriculture.

There is not that much agriculture down in the Keys. It is mostly in Homestead and South Florida and the agricultural districts south of Lake Okeechobee, as the Chairman was describing, so I am reasonably confident that a large portion of the phosphorus that is going into the waters surrounding the coral reefs themselves is actually originating from domestic sewage effluent, which is not properly being treated.

As I mentioned in my testimony, this is one of the worst possible places you can try to use a septic tank. The soils just have no capacity to take up the nutrients.

Mr. **Hastert**. Dr. Fujita, lend us your expertise a little bit there. We talk about the reefs and the ecosystems and the beauty and that type, but what function do they play, and if they are destroyed, what is the prognosis?

Mr. **Fujita**. Well, the reefs produce all of the calcareous sand that makes Florida such a nice place to go, all that nice white sand in Sarasota, all that is carbonate sand, and it is all biologically produced. The reefs are the center of that production.

Another thing they do is they buffer land from storms. The forefront of the reef is made up of a bunch of branching corals that break under wave stress, and if the reefs weren't there, you would see the mangrove swamps being taken out with every nor'easter that came through, and very large flooding problems and damage on land far inland than what you currently see with the reefs out there protecting the coast.

In addition, coral reefs, because they are so biologically diverse, are being seen as the sites of very exciting new pharmaceuticals. There are some immunosuppressant drugs that have been discovered from coral reef organisms, some antiviral compounds. It is very analogous to a tropical rainforest in that reefs are the center of biological diversity in the sea much as tropical rainforests are the centers of biological diversity on land.

Mr. **Hastert**. Do they have a purifying effect, the polyps or the animal bodies, do they purify or filter?

Mr. **Fujita**. They don't appear to be as good at that as, say, a salt marsh is. I have worked on both kinds of systems, and my research indicates that coral reefs have very low thresholds, and they are very sensitive to toxins and nutrients, and although toxins and nutrients do accumulate in the reefs, they don't do them any good. They tend to degrade the species composition, and that is well-documented over the last ten years. Species composition has changed.

The pictures that I showed you indicate that coral reefs do not tolerate large amounts of nutrients. They tend to change in the way I showed you from nice diverse corals to something that is overgrown with large amounts of algae. A marsh wouldn't tend to do that under nutrient loading. A coral reef does.

Mr. **Hastert**. Thank you, Dr. Fujita.

Thank you, Mr. Chairman.

Mr. **Nowak**. Congressman Pete Geren from Texas.

Mr. **Geren**. Thank you, Mr. Chairman.

Dr. Fujita, I would like to ask you to direct your remarks for a moment to the impact of offshore drilling on reefs. I don't want to sound like Marion Barry, "If it weren't for the murder problem here, we wouldn't have much of a crime problem at all," but not looking at spills, but looking at the siltation problems you referred to earlier, and what is the impact of offshore drilling without considering spills, where certainly the disaster there is well understood by all of us, I think.

Mr. **Fujita**. Well, I have limited experience in impacts associated with exploratory drilling and routine operations, but I do know that the drilling muds contain barium, heavy metals, and these are note likely to be good for coral reef systems.

In addition, just the mere fact that you are creating turbulence in the water from these operations can have a severe effect on turbidity, and another aspect of coral reefs that is clear and obvious, in addition to their susceptibility to nutrient input, is that they can't tolerate lower light levels. They are photosynthetic organisms.

The reef is not a rock. They are made of photosynthetic organisms, and it is just as if you put soil on top of your garden, if you block out light from these organisms, they can't continue to produce the carbonate framework, they can't continue to exhibit the high productivity that is typical of them that support large populations of fish and diversity that is associated with them.

Mr. **Geren**. I appreciate that. When you were talking earlier you mentioned the siltation, and you said dredging, offshore drilling, and I was curious to understand the relationship of the siltation and the offshore drilling. Thank you for your remarks. Appreciate it.

No other questions, Mr. Chairman.

Mr. **Nowak**. Thank you.

Let me just ask a question while Mr. Cox is coming.

In numerous conversations we had, groups have questioned reliance on water quality criteria alone because it doesn't take in effect the total bioaccumulation of toxins, and I wonder if, Jessica, you could address that portion of the bill.

Ms. **Landman**. Water quality criteria that are intended to protect human health are supposed to consider the impacts on human health of, for example, fish consumption where the fish had been—had acted as a bioaccumulating organism. We have some questions about whether EPA always adequately considers levels of bioaccumulation in fish tissue when it sets water quality criteria for the states, but that is how the system ought to work.

One problem, though, is that water column, the water quality criteria doesn't necessarily account for the accumulation of toxins in the sediments, and we know that many specially hydrophobic compounds do wind up heavily accumulating in the sediment, so even if they are not present in the water column, they are still potentially serious problems, especially for organisms that live on the bottom and eat nutrients out of the bottom sediments.

So that is one of the reasons why we think the adoption of sediment quality criteria is so essential to properly define what constitutes a healthy ecosystem.

Mr. **Nowak**. Looking at the fees that are established, the question is now being discussed what will that fee do? Will it give some industrial companies the opportunity to continue polluting because a fee may not be, in terms of its size, high enough, and they would rather pay that price, and we would increase some pollution in some areas? How does your community view that?

Ms. **Landman**. Well, the effluent fee system in the CDI is not intended to serve as a disincentive for pollution. In fact, having heard some of the states, including New Jersey, talk about whether the fees that they charge are high enough to actually cause a disincentive to pollute, their answer is, in fact, no.

For example, the highest fee that the New Jersey permitting system might impose would be in the neighborhood of $250,000 on a major chemical company. That major chemical company has profits in the millions of dollars, if not billions of dollars, is barely going to feel the sting of that $250,000 permit fee.

The permit fees are really intended to recoup the cost of administering the program. I don't think we can look to those effluent fees as a means for providing the necessary incentives to end pollution.

Now, there is another provision in the CDI that is intended to serve as that kind of incentive, and that is the provision that requires the discharge to designated degraded waters that the permittee would have to demonstrate a need to discharge before the permit could be reissued. That means that they would have to demonstrate that they had done everything possible to prevent pollution, to reduce the pollutants at their source before they obtained the discharge permit. That is going to——

Mr. **Nowak**. Does that include looking at new advanced pretreatment technologies and so forth?

Ms. **Landman**. It would include looking at whatever technology was available for that industry. You alluded earlier to the question of what pretreatment standards could do, and there was discussion yesterday also of the need to update best available technology standards for all categories of dischargers, and pretreatment standards, too.

I think that is a very important element to consider here. If an industry becomes a leader in developing a new waste treatment technology in response to a provision like the need to discharge provision, then that technology, which will then be the best available technology for that industry, should become part of EPA's BAT effluent guidelines; and that is one of the reasons that we need to see these effluent guidelines periodically revised based on developments in the technology in different industries for waste treatment.

Mr. **Nowak**. Thank you.

Let me turn to Chris Cox from California.

Mr. **Cox**. Thank you, Mr. Chairman.

I would like to thank each of our witnesses for providing compelling testimony on the subject at hand. I think you have made the case convincingly that the arsenal of laws does need to be fortified. I wonder whether you could react to a question about state versus Federal management with respect in particular to California.

In the oil spill area we have had debates in the Congress about preemption, as you know, of state laws, and I have opposed that preemption, as I believe all of you have, in large measure because in some cases states do a better job, and we ought at least to have both arsenals, as it were, at our disposal.

We have got testimony from the Water Resources Control Board in California that they are concerned that H.R. 2647 is going to make it more difficult for them to carry out what they believe to be more stringent California provisions. In particular, they mentioned that Big Green, if it passes, and it looks as if it is going to, is going to contain provisions dealing with ocean water quality that go far beyond what would be required under 2647. They are worried about not only duplication but creating a Federal impediment to aggressive state efforts in this area.

I am wondering if you could tell me whether we ought to worry about this sort of federalism aspect of 2647, and if you have any suggestions on how we can make it work.

Ms. **Landman**. I am not clear on why it is that these assertions have been made about H.R. 2647. My reading of the bill is that it does continue the Clean Water Act's current pattern of allowing states to adopt more stringent requirements than the Federal minimum level that are required in the Clean Water Act.

If there are particular provisions that have been flagged for you by people from California, I think that probably the authors of the CDI would be very eager to identify those provisions and probably make whatever changes are necessary, but it is my impression that that is not at all the intention of the CDI.

Mr. Cox. Any other reactions?

Mr. Fox. I think that is exactly correct, that there is nothing to my knowledge in that bill that would preempt states from doing anything more stringent. Generally as a philosophy and a policy environmental groups, I think you are right on target, want minimum Federal standards from which states can act and do things stronger if they want.

I think one important aspect to highlight for the Chairman is the provision in Big Green that would eliminate 301(h) waivers, which has been an issue in southern California, particularly Los Angeles County, sewage effluent, and San Diego.

Mr. Cox. So we shouldn't be crafting legislation with the idea that we need to run over California because they are not doing a good job, but what we are going to be trying to do with this bill hopefully is give California a free hand but also have minimum Federal standards that to the extent possible do not interfere with that; is that right?

Ms. **Landman**. I think that is a fair assessment of it, yes. I think the general sense is that what California might have to do in response to the CDI would be to provide EPA, for example, with an assessment of how their coastal management program met the coastal protection program requirements of the CDI, which clearly it would if it is an exemplary program. So it would be perhaps a question of the state fearing EPA more than of the state having to reduce its activities. If anything, those activities, I believe, would be encouraged under CDI.

Mr. Cox. Well, I appreciate that, and I commend to you the testimony of the California State Water Resources Board, which might be made available to you by our committee staff. You might, in your spare time, respond directly to their concerns. I think that this is an easily solvable problem if we focus on it before the bill gets along too far.

Ms. **Landman**. Thank you very much.

Mr. **Nowak**. Thank you, Mr. Cox. We will keep—again I will mention it because I think it is important to keep the record open as we go through all the testimony and bring it together, and we will be looking at some of the gaps and some of the differences between the bills. But I think you have all made good contribution to our total text, and I want to thank you for your information.

And we will be perhaps giving some further questions in writing to you, and if that is found necessary we hope you could reply within a reasonable time, because we don't want another session to go by.

Thank you very much.

[Ms. Landman's prepared statement appears on p. 264.]

[Mr. Fox's prepared statement appears on p. 240.]

[Mr. Fujita's prepared statement appears on p. 254.]

Mr. **NOWAK.** Let me now call from the Association of State and Interstate Water Pollution Control Administrators, Linda Eichmiller, who is the deputy director of that organization.

TESTIMONY OF LINDA EICHMILLER, DEPUTY DIRECTOR, ASSOCIATION OF STATE AND INTERSTATE WATER POLLUTION CONTROL ADMINISTRATORS

Ms. **EICHMILLER.** Thank you. The states appreciate this opportunity to testify before the committee on the very important issue of coastal protection. I would like to submit my testimony for the record and move on the just identify and share with you some key state concerns in several areas.

We believe that the Clean Water Act is a very sound, very effective piece of environmental legislation that is designed to address marine problems and that it should be the primary vehicle for doing so as it relates to water quality.

When you look at many of the requirements in the legislation that has been proposed on the House and Senate side, we find that many of them are, in fact, already addressed in the act itself such that we see no further need at this time for substantive legislation. The requirements are ambitious, states are making very courageous efforts by leaps and bounds to move the program forward. We think that we should take time and implement those requirements, see what works, see what is broken, and then fix it.

The two areas where we would like to work with you in addressing in the form of further legislation coastal problems are two. One of them has been discussed, that is financial; and the other one is a better integrated relationship between the Coastal Zone Act and the Water Quality Act. In the area of financing, that is the problem that is confronting states in terms of controlling coastal pollution that is to us absolutely the most important, and that no action of Congress is more important than supporting additional Federal funding.

In the area of state management, we estimate under the Clean Water Act that the costs for implementing that act by 1991 annually are in the $640 million range. That is a very conservative estimate. It is twice what is going into those efforts by Federal and state governments.

One hundred six authorizations would have to be increased by 100 percent to $140 million level just to provide a modest 25 percent Federal fair share, so we have a funding gap that is enormous to the extent to which we can collapse that gap or minimize it. I think we are going to see some very effective coastal protection beyond the efforts that we have seen to date, which have been very substantial.

The other area in which financing is needed is in the area of infrastructure. It is impossible to solve the marine problems without addressing municipal waste water treatment, CSOs, storm water, nutrient removal and nonpoint sources. That is why, as you all know, we are so concerned that the SRF be fully funded at the $2.4 billion level.

Obviously that is a problem right now for obvious reasons. Therefore, it is our recommendation and we seek your support to get an appropriation level for 1991 to 1994 that is adjusted so that by the end of 1994 we can get our $18 billion commitment that was made in the Clean Water Act.

I would add by example that to receive that $18 billion commitment by the end of 1994, what we are really looking at is maintaining the existing funding level. There has been a lot of talk in this committee today, and I understand yesterday, about funding. Our concern goes not only to the SRF through 1994 but beyond 1994, and I am sure you share those concerns.

We believe, and we have thought about this and would like to let you know that we believe a $2.4 billion authorization level is necessary after 1994 because there are many needs that are more obvious now to us than were during the Title VI development that relate to such things as toxics, storm water, and combined sewer overflows.

I am not suggesting that we extend the SRF. I am just suggesting that the infrastructure needs are there, and keeping that authorization in one form or another is one way of addressing over the long term of financial problems that this committee is grappling with.

I understand that you have been looking quite a bit at fee programs, and I will share with you one concern that the states have. We are concerned that a Federal fee program not overlap or be inconsistent with state fee programs. At this point in time, 20 states have fee programs. They are collecting $35 million approximately, 92 percent of which goes directly into the water program.

The basis upon which those fees are calculated vary. They include the size of the discharge, the discharge volume, the pollutant type, the permit complexity. These fees are, at the present time, state sources of funding. The concern we have for the Federal fee program is that that state source of funding will no longer be there to fund their activities. It will be, in essence, a Federal fee program, and it is not clear in that sort of instance and the Peter-to-pay-Paul situation what is gained at the state level, particularly for those that have substantial fee programs, so that we are concerned that it not abrogate a state funding source.

In addition to financing, the other area where we see a lot of need for Federal assistance in the form of legislation is to help us integrate the Clean Water Act with the Coastal Zone Management Act, and we would encourage Federal legislation that triggers a coordination process between the two agencies at the state level or two entities where they are under the same roof.

For example, under a simple memorandum of agreement, this would in essence constitute a single plan using the many existing mechanisms that we have. The structure of this coordination that would be used between the two agencies should be left up to the state, and states should have flexibility as to the substantive requirements and implementation strategies, since they vary so much from area to area.

There was talk this morning about the Coastal Zone Management Act. I would just make two observations. It is my understanding that the CZM Act as it currently stands doesn't really emphasize much in the way of resource protection. Perhaps if it did, some of the problems in terms of development could be addressed by putting resource protection on a more equal footing with other aspects of the Coastal Zone Management Act.

I would also add in terms of the Coastal Zone Management Act and other acts, and also financing in general, the observation that was earlier made that there are many indirect subsidies through transportation funding and that sort of thing that in essence end up secondarily impacting, encouraging things we don't want to occur. I think that you should look at those sorts of subsidies that go way beyond obviously the Clean Water Act or the Coastal Zone Management Act.

A final issue I would just like to highlight, as I know you are concerned about it and have some interest in it, is standard setting. We very firmly believe as states that that should be a state responsibility. Substantial progress has been made under the 1987 amendments.

I think you will see today, as I am sure EPA talked yesterday, states have a lot more marine criteria than they have in the past. They have a lot more toxic criteria. What we would like to see is that momentum be allowed to continue. EPA, in our opinion, doesn't have the information or the expertise or resources to establish sound criteria for what are many diverse waters, Boston Harbor, Long Island Sound, Sarasota Bay, Puget Sound, they are all different. They have common elements, but they are all different.

Another point of concern for us which was mentioned by Mr. Cox is that while EPA may leave or the Federal Government may leave states to have more stringent standards, there are many states that are prohibited by state law from having more stringent standards than the Federal Government, so there is a concern that Federal standards, in essence, by law for some states will prohibit them from going above those standards. In other areas it may not be required by law, but there is a dampening effect so that a Federal standard, if the Federal Government has the prerogative or the sole responsibility for promulgating standards, becomes a ceiling and not a floor for action.

In terms of the use of standards, they are a very important tool, but we believe that they should not be in all instances the driving force for action. Numeric criteria are appropriate, they make a lot of sense for public health as well as sediment management, and I would agree with Jessica that we desperately need sediment criteria, but there are important caveats which I would like to leave with you.

Numeric standards can have little value for protection of fisheries because of the migratory patterns, and they deal with water column and not ecosystem factors. They have little usefulness for pollution sources where there is large dilution, where it is not a small estuary, and they are very time-consuming to adopt. They can delay cleanup efforts, debate focuses on numbers rather than us proceeding to take actions.

So in summary, we are not at a loss for authorities in the Clean Water Act. We believe as states that the 1987 amendments are extremely ambitious. They are almost frightening, but they are very challenging, and we want to move forward and implement them. And we would encourage you in the reauthorization of the Clean Water Act to look at what is broke and work together to try to fix those.

And in the context of the coastal legislation at this time, we would emphasize two major issues. One is the need for financing. There are very critical issues that are difficult to deal with, and I am sure with the cooperation of everybody we can find a solution to this; and also better integration of the two laws. There is a very simple mechanism such as memorandums of agreement between agencies to in essence make all of our efforts much greater in a sense than the sum of its individual parts.

I will be free to answer questions if you have any.

Mr. **Nowak**. Thank you very much.

The process of trying to set standards, in looking at the different bodies of water that have different state impacts, you can go up the Mississippi and go all the way down and impact eight or nine states, and it ends up in an estuary that is getting depleted. I am wondering how do we not set at least a minimum standard that a state can look at and say, well, we can meet that but we don't really just want to meet it, we can exceed it, and that flexibility will be in and the state could meet it, or exceed it; and on the other hand at least a state, receiving state in the Great Lakes, whatever is put in in Duluth goes by Buffalo someday, after our lives, but it will go by Buffalo and end up into the bottom of Lake Ontario, and the Canadians get very upset when Hooker and other plants put anything of that nature into the Niagara River.

How do we address that if we let every state set whatever they want?

Ms. **Eichmiller**. If there is an inconsistency in terms of standards, and there are provisions in the Clean Water Act to deal with that, then I feel that they must be addressed. We have under the act, we believe, in essence, an ecosystem approach.

You can take a water quality standard, we have found that out for example with states working along the Long Island Sound, if you look at that standard and compare it to the waters, you could have the best standards, you could have standards for everything in the world, and it doesn't necessarily tell you much, because as you know I said earlier, some of them are ambient, they are not ecosystem, you may pass good health in the standards category, but yet you know you have a problem.

What states have found useful is to move forward and adopt standards they feel need to be adopted. Sometimes you have to identify your problem first and then work to develop a standard and move towards what you feel are meaningful control mechanisms, so I think you have to come at it both ways, is what I am saying, and do some obvious techniques.

You know, you have municipal waste water treatment problems. You don't have to set standards to solve those problems, nonpoint sources, they need to be controlled and states can come together in interstate cooperative agreements, whether they are not conferences, and they do, to put controls into place way, way up the watershed, far, as you say, and that we don't need to wait and in fact to achieve the kinds of controls can't solely rely on those standards. It takes a number of skilled mixes and commitments to do regulatory and scientific type of program, standards or not standards programs.

Mr. **Nowak**. Well, then, we don't need them, any standards?

Ms. **Eichmiller**. Oh, yes, we do. We do need standards. We definitely need standards, but we also need programs that kick into place without having to wait for the information to see if you have a standards violation.

And sometimes, as I said, we may look at our standards and say well, we look fine here, but yet scientifically we know that we have to take action. And those actions don't necessarily have to be solely contingent on a water quality standards violation.

So I don't think we should solely rely on standards.

Mr. **Nowak**. We should have standards plus?

Ms. **Eichmiller**. Right.

Mr. **Nowak**. The bioaccumulation that has been mentioned today and yesterday, would that have a role in that?

Ms. **Eichmiller**. Yes.

Mr. **Nowak**. In the problem solving?

Ms. **Eichmiller**. Yes. It definitely has a role, and at this time, it's becoming for states an increasing concern because as Jessica said, there is more work that needs to be done in terms of developing some technical guidance from EPA's point of view, but particularly on interstate waters now what is happening is that we have FDA standards, and we have EPA standards, and they are not necessarily consistent.

So that is creating a lot of confusion so that we have encouraged, and EPA, and it's my understanding FDA have agreed to work together to get a more commonality in terms of the risk factors and the methodologies so that there is more consistency.

So right now in some areas, there is a lot of confusion as to really what standard should hold and be used.

Mr. **Nowak**. The funding that is mentioned in the Studds Bill, 80 percent of that would go to some local state organization involved with the total pollution control picture, the coastal management people, on up to the state.

And that fee would be, I guess, in addition to some of the fees that are now collected by various states, which fund their own local efforts.

And we look at the state fee program, your members feel that we could not accomplish another system if there was a hold harmless clause, so to speak, for the state systems that are now in existence.

Ms. **Eichmiller**. Well, that would be helpful, but the problem that I see there is obviously these are established by state legislatures and can be taken away by state legislatures.

And I don't know, for example, if industry is going to look at it that way, if they are paying substantial fees, and there are more than several states that have very substantial fee programs.

I am really not sure that they are going to want to pay two fees for in essence the same service. So we have concerns, not only from a state point of view, but how the payer is going to view these.

And the states are concerned they may see their fee systems potentially diminished or eliminated with a Federal fee system. They are complicated issues, and I think that there is a way out of this.

I don't have an answer right now, but there is a concern that a Federal fee system may in essence eliminate a substantial source of state funding for activities that are going under the Clean Water Act, such that they will be left with no benefit from that exercise.

Mr. NOWAK. Are there any of your state members receiving or collecting any money from the local sewer treatment or water providers for general state environmental programs by methods other than the fee system?

Ms. EICHMILLER. That is a good question, and I don't have an answer to that. But my impression is that other than—under the SRF in terms of a long fee basis that that may not be used that extensively.

That is something I can look into.

Mr. NOWAK. The states, as I have been, I am sure, are starting to hear from their local governments, especially some of the cities, with very large CSO problems and have perhaps built their secondary treatment with the money that they did receive and now are looking at improving the CSO problem.

And those dollar numbers are coming in very, very high, and the engineering firms are giving those estimates.

Would you think the states are going to become involved with any type of program that will joint fund that CSO in addition to the Federal loan program that is out there?

Ms. EICHMILLER. You aren't talking about a grant program, are you?

Are you going to keep that program in mind, just in concept?

Mr. NOWAK. I am just wondering how that is going to start to be facilitated, you know, put up the 12.5 percent to build two local sewer treatment plants, and we put up 75, and they had to raise 12.5 percent themselves, you know.

Ms. EICHMILLER. Under the fund that is currently being administered, I am really frankly surprised myself, but I think perhaps we have taken care of our secondary treatment, that what we are seeing is in no small number of instances, states with CSO problems are funding a CSO, combined sewer overflow correction.

Obviously, more could be funded if the appropriation level were higher. However, even at its authorized level, as you say, the needs are very large. So that I think the SRF can make a major dent in that, and as the funds revolve, I think that there is a real opportunity to deal with those problems.

In some key instances here, in some states, CSOs aren't being addressed. One reason is that the appropriation level is not at the authorized level, so that will be of assistance.

But we recognize that because the CSO needs are so large that the full capitalization of the fund isn't going to completely solve the problem.

That is why we are really sticking our necks out here and saying things about 2.4 beyond 1994 for some sort of infrastructure program.

Mr. **Nowak**. Thank you very much.

Let me turn to Dennis Hastert.

Mr. **Hastert**. I have no questions, Mr. Chairman.

Mr. **Nowak**. Mr. Cox from California?

Mr. **Cox**. I would like to thank our witness for very enlightening testimony which I had the opportunity to read, and I have no questions at this time, either, except if you happened to be here when I asked my earlier question, if you might have any thoughts on that.

Ms. **Eichmiller**. Thank you.

I was almost going to bring that up myself. I haven't read California's testimony, and they were right down the hall, but I was too busy preparing my own. So I am not really sure exactly what their problem is.

But a problem that many states have, and it's a state law problem, not a Federal law problem, is that they by law cannot have standards more stringent than the Federal Government, period, end of story.

And in some other instances where that is not the case, it's just a general damning effect so that Federal standards become a ceiling rather than a floor.

So that is a problem we see in general with national promulgation of standards. I would have to look into the California situation a little bit more to comment on specifically what the problem is.

Mr. **Cox**. I think it's fair to summarize the testimony as follows: First, there was concern that California might be restricted in establishing its own priorities as against what the Federal priorities might be.

And given that coastal problems in Florida and coastal problems in California are different, a one-size-fits-all standard might not work as well as what Californians think they could do on their own.

Second, there is a jurisdictional problem. It's an interagency relationship problem. There is concern about duplication of effort and so on that would impede the efficient fulfillment of statutory requirements and policies.

Ms. **Eichmiller**. I cannot disagree with anything you have said.

Mr. **Cox**. I didn't say it. I just——

Ms. **Eichmiller**. Well, what you read. I cannot disagree with that.

But the problem with standards sometimes is the things you think you have as a problem, but you really don't have as a problem, or it does askew priorities if, you know, the one size fits all, there is obviously a weakness in that, and the duplication of the bureaucracy certainly is a danger.

Mr. **Cox**. Well, thank you. And obviously as this legislation moves forward, it would be helpful if those problems could be worked out by the people who know the state point of view better than we do, such as yourself.

Ms. Eichmiller. That is what we are here for.

Mr. Cox. Thank you.

Mr. Nowak. Once again, thank you for your testimony.

We will, of course, be back in touch with you as we try to focus on some of these tougher problems, and look hopefully for the states to come back after you have seen what other testimony we have had, hopefully you can take that back to all of the administrators in your organization and see if they would have any further suggestions that would be helpful as we move along into consideration of some of these initiatives, whether it be, you know, the Clean Water bill or separate initiative such as this, or perhaps even in the coastal management.

You have heard the zoning problem that one of the earlier witnesses alluded to. I don't know if you want to solve that, set up a zoning appeals board within your organization or something.

Mr. Nowak. But there are, you know, those impacts, and somebody is going to have to start solving these problems, including the funding problem that you mention.

If nobody wants to fund them and we just talk about the problems, then they are not going to seem to get any better.

The assessments that are out there, the needs are, you know, for doing our water related work is somewhere around $80 billion, and, of course, 20 billion will be available through the loan program carrying it out to, I guess, 2020 or something.

But there is nothing else, and we either have to face the fact that we are not going to do anything and just let the system run and get worse, or have to vote some type of combination of solution to it.

And hopefully, the administrators are looking at the situation along the lines that Dr. Levenson mentioned, the environmental costs of what we are producing out there in the environment, and what particularly the water related kinds of issues are producing.

So if you have any future thoughts, we are going to keep the record open and will be available, both formally and informally for that input.

Ms. Eichmiller. We are looking forward to it.

Mr. Nowak. Thank you very much.

These hearings will now stand adjourned.

[Whereupon, at 12:07 p.m., the subcommittee was adjourned.]

[Ms. Eichmiller's prepared statement appears on p. 233.]

PREPARED STATEMENTS OF WITNESSES

PREPARED STATEMENT OF LINDA EICHMILLER

ASSOCIATION OF STATE AND INTERSTATE WATER POLLUTION CONTROL ADMINISTRATORS

Testimony before the
House Subcommittee on Water Resources

May 10, 1990

Mr. Chairman, Members of the Subcommittee:

My name is Linda Eichmiller, Deputy Director of the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA). ASIWPCA is the national non-partisan organization of State water professionals responsible for the implementation of this nation's water quality programs. The Association commends the Subcommittee for its strong support of State Clean Water Programs. We are pleased to have this opportunity to discuss our views on protection of marine waters.

States share the Congressional concern on the need to protect oceans as well as other water resources from pollution. The bills before Congress (e.g. HR 2647; S. 587, 1178, and 1179) address many vital issues, recognizing the need for more progress and rejuvenating critical ongoing activities under the plethora of Clean Water Act mandates.

The Clean Water Act is designed to address marine problems and should be the primary vehicle. Many of the requirements in the proposed legislation are already a priority under the 1987 Water Quality Act. Therefore, the need for further legislation at this time is minimal. However, States agree more needs to be done to fully implement those authorities.

We submit that further Congressional attention should be directed at the following issues:

1) **THE PROBLEM CONFRONTING THE STATES IN PROTECTING COASTAL WATERS IS PRIMARILY FINANCIAL.** No action the Committee can take to protect oceans is more important than to secure Federal funding support to at least the authorized levels.

   State Management: Federal support is eroding with Section 106 funded at 1972 levels considering inflation. Termination of the Construction Grants setasides will cripple State programs unless further action is taken. $640 Million is conservatively required to implement the Clean Water Act which is approximately twice as much as currently provided. The 106 authorization would have to be doubled to $140 Million -- just to maintain a 25% Federal fair share. The President's Budget request of $81.7 Million represents a positive step towards achieving State program adequacy. However, the additional $16.5 Million requested under Section 104(b) should be allocated instead under Section 106 for NPDES activities to integrate initiatives toward a common goal. In addition:

.. Section 319 should be fully funded.

.. Federal fee programs should not overlap or conflict with State fee mechanisms. 26 States (NPDES delegated and non-delegated) have water permit fee programs with revenues totaling over $35 Million -- 92% of which is dedicated to the water program. The basis of calculation varies and can include industrial/community size, discharge volume, pollutant type, permit complexity, etc. States are concerned about the potential for a Federal fee program to, in effect, take back or deny them that vital funding source for existing activities in the future. Under any national fee program proposed, funds should go directly to the States for use in their priority activities.

Infrastructure: It is impossible to solve the marine pollution problems without tackling municipal wastewater treatment, combined sewer overflows, nutrient removal and nonpoint sources. $2.4 Billion is needed for the State Revolving Loan Fund (SRF). Appropriations for FY 1991 - 1994 should be adjusted accordingly to complete the $18 Billion commitment in a timely manner. This would require, for example, maintenance of the existing $2 Billion funding level. ASIWPCA also believes there is a need to retain the $2.4 Billion appropriation after FY 1994 to enable States to address combined sewer overflows, toxic pollution, stormwater, and other needs which have gained emphasis since passage of Title VI.

2) **EXISTING FEDERAL & STATE AUTHORITIES UNDER THE CLEAN WATER AND COASTAL ZONE MANAGEMENT ACTS NEED TO BE IMPLEMENTED IN A MORE INTEGRATED MANNER**. Federal legislation should trigger the coordinated use of coastal water quality protection responsibilities of the State water quality and coastal zone agencies, for example through memorandums of agreement. This would, in essence, constitute in a single plan using existing authorities. The structure of this coordination should be determined by each State, with flexibility as to requirements and implementation strategies -- so long as the extensive requirements of the Clean Water and the Coastal Zone Management Acts are met.

3) **STATE PLANS DEVELOPED SHOULD APPLY EQUALLY TO FEDERAL AND NON-FEDERAL PROJECTS**. Federal law should not preempt State authority.

DISCUSSION

In considering legislation, the States encourage the Subcommittee to:

- **Recognize the value of the extensive ongoing efforts** to protect and enhance marine waters underway in the States -- often against formidable odds given the limited funds available and complex issues involved. The 1987 Water Quality Act is just now being fully implemented.

- **Build on the institutions and activities already in-place** to promote further efforts without delay.

- **Distinguish between situations** where 1) legislative authority exists to solve problems but is not adequately carried out -- i.e. where Congressional oversight is critically needed, and 2) inadequate authority exists -- i.e. where further legislative action is needed.

- **Avoid reporting and unrealistic requirements** that divert resources from ongoing comprehensive programs.

- **Recognize marine pollution problems can be complex.** The answers are frequently not readily apparent, and remedies can be time consuming to implement.

Revisions to Existing Programs: **GIVEN THE FACT THAT THE 1987 WATER QUALITY ACT IS JUST NOW BEING IMPLEMENTED FOR TOXICS, WATER QUALITY STANDARDS, STORMWATER, NONPOINT SOURCES, PRETREATMENT AND CONTROL OF COMBINED SEWER OVERFLOWS -- IT IS PREMATURE TO AMEND THOSE PROVISIONS AT THIS TIME.** In our judgement, such action will only lead to confusion and delay. We encourage Congress not to foster bureaucracy. Legislation should build on the State/Federal partnership with a simple planning and funding program using existing organizations and mechanisms. Redundant, overlapping, or complex new Federal organizations/programs are not needed.

The marine environment can be protected only with a strong basic water program. The proposed bills before Congress appropriately add emphasis and direction to the Clean Water Act requirements for oceans protection. But, the ongoing water programs do not end at the coast. Water quality standards, effluent limits, toxics control, stormwater, nonpoint source and combined sewer overflow programs apply to all waters. Unfortunately, resource constraints, in most instances, have eliminated the availability of new funding for environmental programs. We are concerned, therefore, that new legislation not exacerbate the situation by diverting increasingly scare resources from State management of the overall national water program. Oceans and bays receive the wastes from many rivers and land uses. Increasing reporting, monitoring, enforcement, standards development and control of pollution sources along an arbitrary coastal shoreline may not enhance water quality or improve living marine resources.

For example, in Connecticut all freshwater streams drain to Long Island Sound. In fact, much of the waste from Massachusetts, Vermont and New Hampshire is drained by the Connecticut River, contributing more than two-thirds of the freshwater discharge to Long Island Sound and much of the pollution. Clearly, inland water quality management activities cannot be divorced from water quality strategies for the Sound. An unwarranted focus on specific direct discharges to coastal waters may, in fact, impede overall progress.

New efforts are needed to control the collective impact of multiple sources of pollution to marine environments. Those waters to be addressed should be defined by the States. Priorities will vary (e.g. in some instances it may make sense to focus more on public health vs. ecosystem problems, on prevention vs. remediation, or on waters most likely to yield public benefits for the resources available). There are a myriad of Clean Water Act authorities under Section 208, 303, 304(l), 319, and 320 designed for these purposes. Solutions will require new control measures directed at the problem sources which:

1) Are not just related to water pollution or coastal sources, and
2) Can be implemented under existing regulatory authorities across a myriad of government agencies.

Standards: **STANDARD SETTING SHOULD REMAIN A STATE RESPONSIBILITY. Substantial progress has been made under the 1987 Water Quality Act in setting criteria for marine waters. That momentum should be allowed to continue. USEPA has neither the information nor expertise to establish sound water quality standards for the nation's diverse marine waters.** And, due to many State laws prohibiting requirements more stringent than Federal standards as well as likely objections by the regulated community, such a policy change could deter environmental protection. Far more USEPA attention should be allocated to developing sediment, biological and other marine criteria as well as to providing technical assistance to the States.

Water quality standards are a key management tool, but the adoption of numeric standards should not be the driving force behind ocean protection. Numeric criteria are appropriate for public health protection (swimming, shellfish and fish consumption) as well as sediment management, but:

- Numeric water quality standards may be of little value in fisheries management due to migratory patterns and other ecological considerations,

- They may have little usefulness for pollution sources -- except in small estuaries -- because of the huge dilution which is available, and

- Adoption of numerical criteria and standards is very time consuming, which can cause delay in cleanup efforts while debate focuses on numbers vs. action.

__CSOs:__ **RESOLUTION OF CSO PROBLEMS WILL DEPEND PRIMARILY UPON THE AVAILABILITY OF ADEQUATE RESOURCES.** As many of the bills recognize, CSOs are a major pollution source for which there are, fortunately, many effective control techniques. However, as with most environmental programs, prevention is more effective than mitigation, which requires extensive time and resources. While use of Construction Grant funds for CSOs was discouraged, that is not the case under the SRF. However, under-capitalization is inhibiting progress. The Association opposes unrealistic CSO deadlines and specific requirements which interfere with ongoing programs to address CSO's.

__Nonpoint Sources:__ **THE MOST SIGNIFICANT PROBLEM REGARDING NONPOINT SOURCES IS THE DELAYED AND LOW LEVEL OF FEDERAL FUNDING FOR THE SECTION 319 PROGRAM.** Section 319 should be fully implemented, evaluated and refined. In doing so, nonpoint sources should be treated differently than point sources:

- Total maximum daily loads, wasteload allocations and individual control strategies are not only infeasible given technology, current information, and available resources, but unnecessary for State action.

- A two for one exchange of discharge credits between point and nonpoint sources is too problematic to be workable nationwide.

Federal agencies need to comply with State nonpoint source requirements. The 1990 Farm Bill needs to give greater priority to implementing State Section 319 priorities.

__Point Sources__ -- **THE LEGISLATIVE FRAMEWORK EXISTS TO REDUCE POINT SOURCE POLLUTION BUT THERE ARE IMPEDIMENTS TO IMPLEMENTATION WHICH NEED TO BE ADDRESSED.** As advocated by the National Governors' Association formally adopted position:

- __To degraded coastal waters__ which do not support a balanced indigenous population and recreation because of human activities:

  - Permits should reduce pollutant loadings.

  - __New sources__ should: demonstrate there is no reasonable alternative to discharge, fully use source reduction technology economically achievable, and not result in further degradation.

- __To non-degraded waters__, permits should require best available control technology or water quality based limits, whichever is more stringent.

USEPA regulations should be expanded to assure effluent guidelines address the significant pollutants and sources. Since individual control strategies (ICS) are already required by the Clean Water Act, no further ICS provisions are necessary. Waste minimization and decreased loadings are sound concepts which should be required based on their effectiveness in achieving and maintaining standards -- in the context of overall point and nonpoint source contributions and control needs. State resources, in many instances, may be better invested in control of nonpoint sources, air pollution, combined sewers, or stormwater rather than complicated and protracted NPDES permitting.

While it may be attractive to deposit all penalties in a national fund, that would preclude many uses of those funds at the State and Local levels which have benefitted water quality and deterred violations. Such deposits should be optional, with the appropriate use of penalties decided on a case by case basis.

Monitoring and Research: NATIONAL MONITORING AND RESEARCH PROGRAMS SHOULD ADDRESS THE NEEDS OF STATE & REGIONAL DECISION MAKERS. States need to have an active role in setting the national agenda.

- The roles and responsibilities between NOAA and USEPA need to be clarified.
- The Federal monitoring role should be one of primarily oversight regarding development and implementation of State and regional activities.

Research in the areas of atmospheric deposition, biological and sediment criteria, human health risk assessment, fate and transport of contaminants, impacts of land use to water quality impairment, recreational boating impacts, and estuarine modeling are needed. Further education and public outreach programs are critical to helping the public understand the nature of problems and coastal program needs.

Reporting: STATES SHOULD BE INTEGRALLY INVOLVED IN DEVELOPING REPORTING REQUIREMENTS. They should be integrated into existing documents such as the 305(b) Report, since the majority of pertinent water resources data and expertise resides with the States.

SUMMARY

The Association urges the Subcommittee to address coastal issues in the context of the Clean Water Act reauthorization:

- Building upon existing programs and accomplishments, and
- Placing priority on State implementation and integration of Federal activities.

Legislation should be mindful of deficit problems. The nation does not need another "on the books" program building public expectations, which go unfunded.

The lead responsibility of State and regional governments should be preserved. The expansive existing requirements of the Clean Water and Coastal Zone Management Acts will result in much needed progress. Future legislation for coastal waters should address principally two issues:

1) Federal requirements must be accompanied by adequate funding, and

2) Existing Federal and State authorities under the Clean Water and the Coastal Zone Management Acts need to be implemented in a more integrated manner.

We appreciate the opportunity to comment on the legislation and look forward to working with the Committee in the future to protect marine resources.

FRIENDS OF THE EARTH℠
Environmental Policy Institute
OCEANIC SOCIETY

STATEMENT OF CHARLES FOX, LEGISLATIVE DIRECTOR
FRIENDS OF THE EARTH, ENVIRONMENTAL POLICY INSTITUTE
AND OCEANIC SOCIETY

BEFORE THE SUBCOMMITTEE ON WATER RESOURCES,
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
U.S. HOUSE OF REPRESENTATIVES

ON COASTAL ECOSYSTEM DEGRADATION

MAY 10, 1990

Mr. Chairman and Members of the Subcommittee:

I am Charles Fox, Director of Legislative Affairs, for Friends of the Earth, U.S., which includes the Environmental Policy Institute and Oceanic Society. Our statement this morning is made on behalf of the 50,000 members and supporters of our recently-merged organization. We are an affiliate of Friends of the Earth International, a worldwide environmental network with member organizations in 39 countries.

Thank you for this opportunity to present our views. As you know, there have been a number of proposals put forth by Members of Congress, including Members of this Committee, to address serious threats to the nation's coastal environments. Rather than discuss and evaluate these proposals at this time, we would like to focus the Subcommittee's attention toward what we believe to be the single biggest threat to coastal environments. It is a threat which, unfortunately, has not been addressed adequately in any of the proposals that have been introduced to date.

This threat is uncontrolled growth and development in coastal regions. It is one of the most complicated and politically-challenging issues facing federal, state and local officials. It is an issue which, in our opinion, cries out for federal leadership. Simply put, federal coastal protection legislation cannot accomplish its long-term goals without strong measures to direct growth to those areas best suited to accommodate it.

I. Coastal Population Growth

This Subcommittee has no doubt become familiar with the frequently-quoted statistics:

* that 75% of the U.S. population lives within 50 miles of a coast, when including the Great Lakes' shoreline; and,

* that half the nation's population live and work in marine coastal counties which encompass less than 10 percent of the country's land mass.[1]

These figures, however, only provide a static snapshot of the problem of coastal growth and development.

Population predictions suggest that enormous coastal growth will continue in the future, particularly in marine coastal areas. A recent study by the National Oceanic and Atmospheric Administration of coastal growth in the fifty-year period from 1960 to 2010 documents these alarming trends.[2]

According to the study, overall growth in marine coastal counties is predicted to rise by almost sixty percent in the period from 1960 to 2010. Nationwide, seventeen of the twenty states with the largest statewide population increases are coastal. By 2010, Florida's population will rank fourth in the Nation, up from tenth in 1960. Only five percent of coastal counties will decline in population over the next twenty years.

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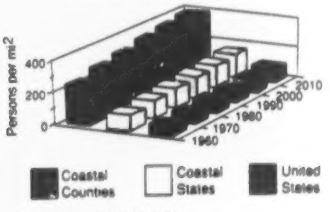
[1] See "Coastal Waters in Jeopardy," Oversight Report of the Committee on Merchant Marine and Fisheries, U.S. Congress, Washington, D.C., December 1988.

[2] "50 Years of Population Change along the Nation's Coasts, 1960-2010," U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Rockville, Maryland, April, 1990.

Population density statistics offer an even more revealing picture of threats to coastal environments. In 1960, overall population density in the United States was 61 persons per square mile. In coastal states, this density was 100 persons per square mile; in coastal counties it was 248 persons per square mile. By 1988, population density in coastal counties reached 341 persons per square mile, more than four times the national average.

Between 1988 and 2010, about 68 percent of all coastal counties will have a population density increase of more than 10 percent. The figure below, which was published in the NOAA report, illustrates the continued population density increases predicted for coastal counties.

Figure 4. *Population Density, 1960-2010*



Note: Does not include Alaska.

II. The Heart of the Problem

Growth and development in coastal regions destroys sensitive habitats and increases pollution loads to coastal waters. It has resulted in massive wetlands losses, increased nutrient pollution loadings, toxicant contamination of waters and sediments, and a general over-utilization of coastal resources. Fundamentally, it has created today's predicament.

> **At the heart of the coastal pollution problem is simple demographics. People crowded onto the water's edge are both the cause of the decline in coastal environmental quality and one of the major reasons why solving the problem is so critical...**
>
> **--Committee on Merchant Marine**
> **Fisheries, December, 1988**[3]

> **Development per se is the principle cause of coastal pollution and physical degradation.**
>
> **--New Jersey Governor's Blue**
> **Ribbon Panel, May, 1988**[4]

Uncontrolled growth and development produce unanticipated cumulative effects. For any individual development activity, for example, habitat losses may be "small" and pollution load increases may be "minor." However, when combined with other activities, entire ecosystems can be threatened. This is precisely what has happened to the nation's coastal environments.

Dramatic declines in coastal fisheries offer a pointed -- and painful -- example of the cumulative, ecological effects of growth and development as a combined result of coastal habitat loss, excessive pollution and over-utilization of resources.

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[3] "Coastal Waters in Jeopardy," page 10.

[4] "The State of the Ocean", Report by the Blue Ribbon Panel on Ocean Incidents - 1987, New Jersey Department of Environmental Protection, May, 1988, page 19.

In Chesapeake Bay, during the past three decades, landings of migratory fish species have plummeted: hickory shad (96%), river herring (92%), striped bass (70%), and American shad (66%). Maryland's oyster harvest has declined 90% from levels of 100 years ago. Submerged seagrass beds, which serve as the primary nursery habitat for living resources in Chesapeake Bay declined 65% between 1971 and 1979.[5]

In the Pacific Northwest, the Columbia River basin steelhead and salmon have declined approximately 75-84% from estimated historic population levels. The Columbia River has lost about 40% of its historic headwater spawning area due to dam placements.[6]

San Francisco Bay has lost more than 80% of its original wetlands to development. Survival of young striped bass have declined in the last five years to levels approaching zero in two major nursery areas. This is thought to be a result of habitat loss and increased pollutant body burdens in the Bay's striped bass population.[7]

Toxic contamination of urbanized coastal areas has increased mortality, decreased reproductive rates and contributed to lesions and cancerous tumors in fish. It has lead to numerous health advisories issued by many state governments to limit human consumption of contaminated fish.[8] Bottom-dwelling fish in areas such as Puget Sound and Boston Harbor have a prevalence of cancerous liver tumors as high as 24% in some areas.[9]

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[5] "Environmental Issues Affecting Living Marine Resources," National Marine Fisheries Service, Department of Commerce, Washington, D.C., January 18, 1990.

[6] Ibid.

[7] Ibid.

[8] "Wastes in Marine Environments", Office of Technology Assessment, U.S. Congress, Washington, D.C., April, 1987.

On any given day, one-third of the Nation's remaining 14 million acres of shellfish waters are closed. In the Gulf of Mexico alone, 61% of the shellfish waters are restricted due to inadequate septic systems, sewage discharges and urban runoff.

> **Increased closures correlate with increased development of coastal property. Since 1980, the number of closed shellfish beds in Massachusetts has increased 30%. This translates as a total economic loss of about $95 million annually for the state.**
>
> **-- Buzzards Bay Project, U.S. EPA, 1988**[10]

III. Existing Programs to Control Growth and Development

There are numerous efforts underway at federal, state and local levels to control the adverse effects of growth and development in coastal areas. It is beyond the scope of this statement to analyze them all, or even a small percentage of them. Rather, we will offer a number examples which capture some of the main issues surrounding programs to control growth and development at federal and state levels.

> **Present laws and regulations have done relatively little to stem the development in the Nation's coastal zones.**
>
> **-- New Jersey Governor's Blue**
> **Ribbon Panel, May, 1988**[11]

A. The Coastal Zone Management Act

The CZMA was enacted in 1972 in response to the growing recognition of the value of the coasts and the failure of state and local governments to manage their coasts effectively.[12] It followed on the heels of the Stratton Commission Report (Our Nation and the Sea, 1969) which emphasized, among other findings, the lack of coastal planning at state and local levels. Eighteen years later, CZMA remains the principle federal program directed toward controlling growth and development in coastal areas.

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[9] "Environmental Issues."

[10] "Bacterial Contamination of Shellfish," Fact Sheet #1, Buzzards Bay Project, U.S. Environmental Protection Agency, 1988, page 1.

[11] "The State of the Ocean," page 19.

> **One significant program that has not lived up to its potential is the national coastal zone management program.**
>
> **-- Committee on Merchant Marine and Fisheries, December, 1988**[13]

CZMA's statutory goals are to both "protect" and "develop" the nation's coastal environments. It is a voluntary program which encourages state participation with two primary incentives: i) federal grants to state governments, funded at approximately $35 million per year nationwide; and, ii) federal "consistency" requirements which provide states with authority to assure that federal activities are consistent with state coastal programs. State participation in the federal program includes 29 of 35 eligible states and territories.

Despite high state participation in the federal program, CZMA has not adequately protected coastal environments from the adverse effects of growth and development. While state programs vary considerably in structure and overall effectiveness, there are several reasons for the problems associated with the CZMA program, including:

- **the Reagan Administration sought for eight years to dismantle the CZMA, including repeated proposals for zero** funding for the state grants program;

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[12] "Towards a National Coastal Policy," Barnett Lawrence, American Bar Association, Winter 1988/Volume 8, Number 3.

[13] "Coastal Waters in Jeopardy," page 29.

* the statute itself contains conflicting goals and does not establish coastal ecosystem protection as the top priority;

* the program's voluntary nature and its relatively small incentives have not provided the federal government sufficient clout in negotiating significant improvements in state coastal programs;

* state coastal programs have not adequately incorporated water quality and wetland protection objectives in state plans; and, perhaps most importantly,

* coastal development pressures have increased dramatically since CZMA was enacted and, with few exceptions, federal, state, and local governments have not been well equipped -- scientifically, programmatically or politically -- to respond to these pressures.

Despite these program shortcomings, CZMA has been responsible for tremendous improvements in coastal environmental planning. At the same time, some of the more innovative and aggressive efforts aimed at controlling coastal growth and development have been proposed at the state level, outside the scope of federal or state CZMA programs.

B. Maryland

In 1984, Governor Harry Hughes successfully proposed and enacted the Critical Areas Protection Act to control growth and development around Chesapeake Bay. Its purpose was narrowly focused to the protection of water quality and the maintenance of habitat. The statute established a statewide commission to approve local jurisdiction's protection programs for a 1,000 foot strip of land around the Bay and its tributaries.

The statewide commission established criteria to guide local program development. These criteria required that local jurisdictions identify three types of land use areas: i) intensely developed; ii) limited developed; and, iii) resource conservation. The criteria required increasing levels of protection for the lesser developed areas. Resource conservation areas received the highest level of protection, including a density limitation of one dwelling unit per 20 acres.

The Critical Areas Program remains a national model, despite significant problems surrounding implementation with particularly recalcitrant local jurisdictions. It is not an "anti-growth" program; it simply seeks to protect lesser-developed areas and channel new growth to those areas best suited to accommodate it.

C. New Jersey

In 1987, Governor Thomas Kean proposed creation of a Coastal Commission to combat rampant coastal development and address a number of problems affecting the Jersey shore. Despite years of compromise and weakening amendments, the proposal failed to become enacted because of powerful development interests.

Similar to Maryland's Critical Areas Commission, Governor Kean's proposal established an independent Commission to develop a comprehensive strategy to protect coastal resources and manage coastal growth and development. It was to be charged with the task of channeling growth to existing built-up areas and designating land use capability requirements. It was also to be granted the power to take enforcement actions against violators of environmental laws.

The Coastal Commission proposal was a result of local government land use decisions being made without adequate consideration of cumulative environmental impacts. Moreover, existing state coastal law had included a 25-unit threshold limit for regulatory action on development proposals. The obvious result of this loophole was numerous development proposals for 24-unit projects with little state control over long-term cumulative impacts.

D. Cape Cod

In 1988, the Cape Cod Commission Act was introduced in the Massachusetts legislature to establish a regional land use planning and regulatory agency. In addition, two ballot questions were put before Cape Cod voters: i) to direct representatives to vote in favor of the Act; and, ii) to direct representatives to vote in favor of a temporary building moratorium for one year or until rules were adopted to control growth. Both ballot questions passed by large majorities. The Act was subsequently enacted.

Similar to Maryland and New Jersey proposals, the Cape Cod Commission Act was created in response to uncontrolled growth and local governments' failure to address cumulative impacts adequately. Unlike the previous proposals, however, its mission was broader than coastal protection. The Cape Cod Commission was directed to develop and enforce a comprehensive land use plan to achieve many purposes.

Environmental issues were preeminent in the Commission's creation. Cape Cod population has grown at more than ten times the statewide rate. The number of new housing units on the Cape from 1980 through 1987 increased by 29%, while the statewide rate remained constant at about 9%. Approximately 5,600 acres of shellfish beds have been closed to harvesting because of pollution, a 650% increase in 8 years.[14]

E. Other States

Numerous coastal states facing tremendous growth and development pressures have recently enacted new comprehensive planning statutes. Most of them include requirements for mandatory local planning consistent with statewide goals. Some were adopted specifically to protect coastal areas, such as the Commonwealth of Virginia's; others were adopted with broader planning requirements, such as the State of Rhode Island's. Other coastal states with newly-created planning programs include Florida, Maine, Washington, and Georgia.

IV. New Federal Leadership

> **The intense pressure on the marine ecosystem created by this (population) migration will require government at all levels, as well as the private sector, steadfastly to resist the urge to overdevelop our coastal areas.**
>
> **--Senator John H. Chafee, June, 1988**[15]

> **We urge the adoption of new state programs to protect critical coastal areas and direct growth to places best suited to accommodate it.**
>
> **--National Governors' Association**
> **July, 1989**[16]

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[14] "Cape Cod's Future", Cape Cod Planning and Economic Development Commission, September 1988.

[15] "What Congress is Learning," Senator John H. Chafee, in EPA Journal, U.S. Environmental Protection Agency, Washington, D.C., June, 1988.

> **While each of us are separately pursuing policies to promote better environmental protection, today we reinvigorate these principles with a renewed federal/state commitment to ... institute new policies to protect coastal lands and preserve vital habitat.**
>
> **--"Coastal Protection Agenda," signed July 26, 1989 by Governors and Members of Congress from 10 coastal states**

The question of an appropriate federal role in controlling growth and development in coastal areas is a extremely difficult and controversial one. Historically, these issues have been addressed almost exclusively at state and local levels.

Yet, the federal interest in protecting coastal ecosystems is abundantly clear. It is a threatened national resource which drives local economies and contributes to the nation's high quality of life. The eighteen-year-old federal Coastal Zone Management Act acknowledges this vital national interest.

The longer effective solutions are put off, the greater the problems become. Better stewardship and management of the land and better direction and incentives for appropriate growth are needed. It is much easier -- and cheaper -- to prevent a problem than to correct one, which is why action is needed now.

Without effective programs to control growth and development, improvements in coastal ecosystems will be short-lived, if they occur at all. With few exceptions, today's programs at state and local levels are not adequate to confront the enormous pressures of population growth and development. Subdivision after subdivision is being approved by local

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16 "Ocean and Coastal Pollution Policy Statement," National Governors' Association, released at Chicago meeting July, 1989.

governments with only modest environmental safeguards. Cumulative effects to the nation's coasts are rarely, if ever, considered in decisionmaking.

Moreover, the political pressures placed upon local officials by developers are truly tremendous. The views of concerned coastal citizens are frequently left out of the process and citizens have few places to turn for assistance.

Strengthened federal leadership is needed. We believe that state governments should be required to adopt growth management programs to protect coastal ecosystems. These programs, in turn, should meet minimum federal criteria that could be developed after extensive involvement of citizens and state and local governments. The criteria should include provisions to protect lesser-developed areas and to channel new growth to those areas best suited to accommodate it. The criteria should also include guidelines for the types of activities which would be allowed in critical coastal areas.

We do not advocate that the federal government become involved in individual land use decisions. Rather, we ask that federal policies *evolve* from existing "voluntary encouragement" to stronger, more effective "minimum criteria" for state governments. These criteria should be defined specifically to achieve the goals of protecting the nation's coastal water quality *and* coastal ecosystems.

Absent forward-looking growth management programs, the cumulative effects of development will not be considered adequately. As a practical matter, it is not realistic to assume that cumulative impacts can be predicted on an individual, project-by-project basis. The poor history of environmental regulatory programs based on such permit-by-permit decisions demonstrates this failure.

Mr. Chairman, we are well aware of the somewhat controversial nature of our recommendations. We are also aware that numerous important questions remain to be answered. However, our communications with coastal citizens groups throughout the country have led us to the conclusion that new provisions for growth and development in coastal areas should be included in federal law.

We would be happy to provide you with more specific information concerning our views. Again, thank you for this opportunity to participate in today's hearing.

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THREATS TO CORAL REEFS

TESTIMONY SUBMITTED TO THE HOUSE SUBCOMMITTEE ON WATER RESOURCES
OF THE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
HEARINGS ON ISSUES CONCERNING COASTAL POLLUTION

Prepared by:

Rodney M. Fujita, Ph.D

Mark S. Epstein, J.D.

~~Good afternoon~~. My name is Rodney M. Fujita. I ~~held~~ have a doctorate in marine ecology and am currently a staff scientist with the Environmental Defense Fund. I have conducted some research on the response of Florida's coral reefs to nutrient loading and am currently studying the sources of nutrients to the Florida reef tract, the impacts of land-based pollution on the reef tract, and ways to reduce threats to the health of coral reefs. In addition, my colleagues and I are studying the impacts of global climate change on coral reefs; in particular, the stimulation of coral bleaching by increased water temperature and other stresses, and the impacts that widespread bleaching may have on the greenhouse effect. ~~I have also examined damage to coral reefs in the Key Largo National Marine Sanctuary due to freighter groundings.~~ I Thank you for this opportunity to comment on environmental problems threatening the vitality of coral reefs. I would note that in addressing the problem of coastal pollution, it is imperative that the subcommittee address the continuous and serious degradation being suffered by the coral reefs and interconnected nearshore ecosystems of South Florida, this country's most important reef tract.

Clearly, physical damage from a variety of activities is a serious threat to coral reefs. Three major ship groundings occured within 2 months last year in the ~~United State's best-developed and most important coral reef, the~~ Florida Reef Tract. Damage from ship groundings, anchor damage, and physical disturbance from divers and snorkelers causes species composition to change and, in some cases, allows algae to dominate reefs. This kind of damage is very deleterious on time scales of a few years to a decade or so. In the absence of other stresses, coral reefs can recover from such physical damage. Indeed, Florida's coral reefs have been subjected to hurricanes every 6 years or so for the last 10,000 years up until 1965 ~~(Wells 1988)~~. While until recently, the reefs have been able to recover from natural and human induced physical disturbance, it is important to realize that these recoveries occurred when water quality was much higher than it is today.

It is important to note that, at present, in addition to physical disturbance, Florida's coral reefs face many stresses which may decrease their ability to recover from physical disturbance and which, if allowed to continue, may result in gross alterations or the complete demise of the reefs. These stresses range from those resulting from local land use and water management, such as siltation and nutrient loading, to stresses related to regional and global environmental problems.

First, let us consider the local and regional threats. South Florida is the site of extensive agriculture, with associated pesticide and nutrient loadings to ground and surface waters. Recently, pesticide residues have been discovered in coral tissues several miles offshore from the land in the Florida reef tract ~~(Skinner and Corcoran 1989~~) within the boundaries of John Pennekamp Coral Reef State Park. Although the source of these pesticides is not yet clear, it seems likely that they, originated in agricultural areas to the north of the Keys. Insecticides applied on land in the Keys to render them habitable may also eventually accumulate in the reefs as well as in interconnected ecosystems such as seagrass meadows and mangrove swamps.

Urban centers in South Florida and dense development in the Keys are likely sources of the increased nutrient levels found in the waters supporting ~~Florida's~~ these coral reefs ~~(Wells 1988; Skinner and Corcoran 1989; Lapointe 1989~~). Millions of people live in coastal areas from Palm Beach to Miami. They discharge hundreds of millions of gallons of sewage and partially treated septage to marine waters. Much of this effluent travels south to the coral reef tract. Coral reefs in South Florida, like coral reefs around the world, thrive in low-nutrient waters. Experimental evidence indicates that elevated nutrient loading, especially of phosphorus, increases the productivity of algae that are normally kept in check by grazing fishes and invertebrates.

Excessive nutrient loading has led to extensive algal blooms in Bermuda and to the complete degradation of coral reefs in Kaneohe Bay, Hawaii. Recently, a patch of branching and soft corals was discovered near Grecian Rocks in the Key Largo National Marine Sanctuary that is severely overgrowth with filamentous algae. ③ ~~Such lush algal growth does not occur on pristine reefs and is unusual in the Florida reef tract. I will submit color photos of a healthy coral and of a coral overgrown with algae from this site at the hearings and will be glad to provide additional copies upon request. It is probably a result of increased nutrient loading.~~ No significant tertiary treatment of septage, which would remove inorganic nutrients, occurs in the region. In addition, most septage in the Keys is treated with septic tanks. Many studies have shown that the combination of porous carbonate soils overlying porous fossil reef limestone, the limited ability of these soils to remove nutrients, high water tables, seasonally heavy rainfall, and the proximity of development to canals and embayments makes the Keys eminently unsuitable for septic tanks and results in a large amount of nutrient loading to adjacent waters. In addition, current plans for a secondary sewage system for areas in the Keys appear to be inadequate. The construction of a centralized collection system and secondary treatment plant will increase the potential for development and accompanying deleterious environmental impacts unless measures to restrict capacity are implemented and strictly enforced. Furthermore, a secondary treatment facility would do little to reduce nutrient loading to adjacent waters surrounding Florida's coral reefs. More appropriate technologies and management strategies exist and should be fully explored if the threat of excessive nutrient loading is to be redressed.

In addition to excessive nutrient and toxin loadings, Florida's coral reefs have proven to be susceptible to changes in temperature. Increased temperature appears to cause corals to expell their photosynthetic symbiotic algae, decrease their photosynthetic pigment content, or both. This is termed "bleaching". Bleaching greatly reduces the coral's ability to secrete limestone skeletal material that is crucial for protection from predators, production of sediment, and growth of the reef framework. Three mass bleaching events in coral reefs around the world have occurred during this decade, the warmest decade of the century. Florida's reefs experienced intense bleaching in 1983, when water temperatures were unusually high. There are no indications as yet of mass bleaching events before 1979. If increased temperature does induce bleaching, bleaching events may become more frequent and more intense as global warming proceeds. Indeed, coral reefs may be the first ecosystems on earth to show the effects of global warming due to the greenhouse effect.

Siltation from poor land use, dredging, or offshore drilling also results in bleaching. In all likelihood, nutrient loading, siltation, toxin accumulation, physical disturbance, increased ultraviolet radiation resulting from ozone depletion, and increased temperatures interact synergistically, enhancing the likelihood of bleaching and perhaps of the coral and seagrass diseases that have had devastating impacts on coral reef and seagrass ecosystems throughout the Caribbean. Stresses imposed on Florida's reefs from global warming and ozone depletion are, to a large extent, beyond local control. These threats should provide further motivation to reduce local stresses so as to permit coral reefs to adapt to global changes already in the pipeline.

Clearly, Florida's coral reefs are threatened by more than ship groundings. While historically they have recovered from physical damage, the current degradation of water quality and other ecological disruptions could doom the reefs. Coral reefs do not appear to be capable of adapting to high nutrient loadings, disruption of food webs, or increased temperatures. Water quality has declined in the region under consideration for designation as the Florida Keys National Marine Sanctuary④ despite the designation of these waters as "Outstanding Florida Waters" and the establishment of the Key Largo and Looe Key Marine Sanctuaries, John Pennekamp State Park, Biscayne National Park, and the Fort Jefferson Dry Tortugas National Monument. Obviously, more comprehensive protection, specifically legislation, that includes the regulation of land-based activities that impact water quality is needed. It is also possible that atmospheric deposition of nitrate originating from nitrogen oxide emissions from cars, power plants, and incinerators could be adversely affecting water quality. We have shown this to be the case in the Chesapeake Bay ~~(Fisher et al. 1988)~~.

A comprehensive management plan that identifies all threats to ~~Florida's~~ coral reefs, including atmospheric and terrestrial sources of nutrients and toxins, should be developed. The plan should include at the minimum the following elements:

1) The development of special water quality criteria for waters containing coral reefs - Existing marine water quality criteria do not adequately protect coral reefs from excessive nutrient loading and other stresses. Florida's coral reefs appear to be already stressed by excessive nutrient loading. We don't know how nutrients and other stresses interact to affect coral reefs. It is unlikely that the capacity of coral reefs to assimilate nutrients without changes in species composition and other detrimental effects can be determined before the reefs are irreversibly damaged. Therefore, it is important to adopt a policy of risk aversion and require that no more nutrients from human activities be allowed to accumulate in sediments, biomass, or the water column. Natural sources of nutrients from groundwater and surface waters, atmospheric deposition, advection from deep and offshore waters, and nitrogen fixation and natural pool sizes of nutrients should be quantified using historical data and data from pristine coral reef systems in the Caribbean. This could serve as the baseline "criterion". Actions to reduce nutrient loadings would be triggered when these natural loadings and pool sizes are exceeded.

2) An environmental monitoring program should be established in the Sanctuary to detect deviations from the pristine baseline described above and to determine the sources of nutrients, silt, and toxins so that these loadings can be eliminated - This may be facilitated by the establishment of a Geographical Information System for the Keys, South Florida, and the reef tract coupled with a hydrological model and a circulation model. Remote sensing and tracer studies may also be required.

3) The environmental monitoring program should include routine temperature, salinity, and ultraviolet radiation measurements to track the progress of global warming and ozone depletion - Studies on the interaction between temperature, salinity, ~~UV,~~ ultraviolet, and other stresses on coral bleaching, as well as on other metabolic and ecological processes, should also be conducted. However, actions to decrease known stresses should not depend on the results of this research. I have attached an outline for an

over

environmental monitoring and research plan to this testimony.

4) Provisions are needed to enhance coordination between federal, state, and local authorities⑤to ensure the protection of Florida's coral reefs and adjacent seagrass meadows and mangrove swamps - Because land use strongly influences water quality, this coordination must include land-based activities. The need for increased coordination of agencies and for strong enforcement of regulations designed to protect Florida's reefs is obvious in light of the failure, in large measure, of previous attempts to protect these ecosystems from physical damage and water quality degradation.

5) Adequate funding and authority should be provided to support environmental monitoring, research, and implementation of management strategies - Past attempts to protect Florida's reefs have been thwarted by local pressures to develop the Keys and tourist activities without any regard to protecting water quality.

Thank you for considering my comments. I hope they are helpful in your efforts to⑥~~protect the Florida reef tract~~. These reefs are an invaluable national resource and support one of the most biologically diverse and beautiful ecosystems on earth. Consequently, a national effort to protect them is required. Comprehensive legislation and rigorous enforcement of regulations that take into account all threats to coral reefs, seagrass meadows, and mangrove swamps, which form an integrated, interdependent ecological complex, are needed to ensure their continued existence and viability. Finally, lessons learned in protecting these critical ecosystems will certainly have value when dealing with more general issues of coastal pollution throughout the nation.⑦

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AN ENVIRONMENTAL MONITORING AND RESEARCH PLAN FOR CORAL REEFS

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Coral reef ecosystems, including the reefs of south Florida, the United State's most important reef tract, are threatened by human activities at local, regional, and global scales. Environmental monitoring and research programs should be designed to detect signs of environmental stress at all of these scales in advance of widespread mortality or deterioration. Furthermore, such programs should seek to assign causes to adverse effects and trigger ameliorative action. The following is an outline of an environmental research and monitoring program for coral reefs.

1. Land use and atmospheric deposition impacts: eutrophication, siltation, and toxins

A. Establish a baseline for atmospheric, surface water, and groundwater loadings of nutrients, silt, and toxins for reefs thought to be relatively pristine. Alternatively, develop budgets for these constituents and separate natural and anthropogenic loadings. Water column concentrations of nutrients, silt, toxins, and chlorophyll should also be measured. Initially, all of these parameters should be measured as frequently and in as many locations as possible in order to quantify natural variability which may be important in structuring the coral reef ecosystem. Later, when temporal and spatial variability has been characterized, a less intensive sampling regime can be designed.

B. Experimentally determine whether plants and algae are nutrient-limited or not with the use of short and long term nutrient enrichment studies in which water turnover rates are ecologically realistic. These studies will indicate which nutrient should be of special concern.

C. Measure growth rate, silt content, and toxins in coral cores in order to determine correlations between these parameters and detect loadings that may be missed in the sampling regime.

D. Monitor nutrient, silt and toxin loading from the atmosphere, surface waters, and groundwater, and compare to pristine conditions. Map the reefs and these sources of nutrients, toxins, and silt on a Geographical Information System coupled to a hydrological model to determine sources of unusually high loadings, and use this to trigger efforts to reduce loadings.

E. Monitor carbon (C), nitrogen (N), and phosphorus (P) content of marine plants and algae and compare to levels in plants and algae from pristine environments at least once each season. Low C:N or C:P ratios should trigger reductions in N and P loadings, respectively.

F. Determine N and P content of marine plants, algae, animals, and sediments in pristine environments at least 4 times per year (once in each season). Calculate the total pools of these elements in each ecosystem component. Accumulation of N or P above seasonal variations will indicate excessive nutrient loading and should trigger action to reduce nutrient loading. These nutrients would not be expected to accumulate in the water column due to the extremely high affinity of coral reef sediments, coral/algal symbioses, and algae for nutrients. Nitrogen and P could be released from any pool and result in eutrophication.

G. Conduct experiments to determine how nutrient loading and grazing intensity interact to control the abundance and productivity of marine plants and algae. For example, excessive algal abundance in an area with low nutrient loading may be due to a decline in herbivore abundance. This finding should trigger actions such as restoring habitat, decreasing fishing or other exploitative pressure, reducing non-native competitors, or re-introducing native species.

2. Pathogen monitoring

Fecal coliform, roundworm eggs, and other indicators of human pathogens should be monitored routinely and be used to trigger improvements in sewage treatment if standards are exceeded.

3. Global environmental indicators and stresses

A. Water temperature in a variety of habitats (including a range of water circulation characteristics), current velocities and directions, salinity, tides, dissolved oxygen, air temperature, rainfall amount and content, wind velocity and direction, and solar radiation (UV and visible) should be measured to provide indicators of global warming and ozone depletion.

B. Photographic transects should be established to record changes in species composition and pigmentation. Changes in pigmentation could be used to monitor bleaching.

C. Remote sensing techniques should be developed to allow coverage of large areas. These techniques should focus on water temperature and pigmentation changes. Widespread bleaching may be an early indicator of global warming, since regional and global bleaching events appear to be triggered by increased water temperature.

D. Photosynthetic capacity, respiration rates, and growth rates should be monitored. Vertical accretion rates should be compared with historical rates, rates in pristine areas, and the rate of sea level rise to determine whether reefs are in danger of become light-limited, abraded, or altered in other ways as a result of global warming-enhanced sea level rise. Measurements of photosynthetic capacity and respiration rates will be useful in determining the potential for bleached reefs to emit carbon dioxide, which would enhance the greenhouse effect.

E. Research should be conducted on the mechanisms that cause bleaching. The isolated and synergistic effects of temperature changes, siltation, and changes in light intensity and/or quality should be investigated.

TESTIMONY

PRESENTED BY THE

NATURAL RESOURCES DEFENSE COUNCIL, INC.

ON BEHALF OF THE

NATURAL RESOURCES DEFENSE COUNCIL, INC.
NATIONAL WILDLIFE FEDERATION
COAST ALLIANCE
ENVIRONMENTAL DEFENSE FUND
AMERICAN OCEANS CAMPAIGN

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES
OF THE
HOUSE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

ON

COASTAL POLLUTION: PROBLEMS AND SOLUTIONS

May 10, 1990

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Mr. Chairman and members of the Subcommittee, thank you very much for providing the Natural Resources Defense Council,[1] National Wildlife Federation,[2] Coast Alliance,[3] Environmental Defense Fund[4] and American Oceans Campaign[5] with an opportunity to testify on coastal pollution issues. My name is Jessica Landman, and I am a Senior Project Attorney with NRDC's Clean Water Program.

Introduction

In April of 1987 the Office of Technology Assessment published a major report on coastal pollution. "Wastes in Marine Environments" documented in detail the many threats to marine waters from human activities. Among the report's most important conclusions were:

- Unless more is done, new or continued degradation will occur in many of our estuaries and coastal areas in coming decades -- even in those areas that have improved in the past;[6] and
- Even if total compliance with existing regulations is achieved, **existing programs alone will not be sufficient to maintain or improve the health of all estuaries and coastal waters.**[7]

Because of this grave prognosis, we have greeted with enthusiasm the introduction in both Chambers of several major pieces of coastal protection legislation -- both because they are emblems of Congress' concern over the state of our coastal waters and because of the many positive provisions contained in the bills.

We now welcome these hearings on coastal pollution, because they signal that this Subcommittee is taking a close look at the OTA's conclusions and is considering the need for additional action to combat the serious public health, water quality and natural habitat problems that continue to threaten our coastal resources.[8]

The legislation that has been introduced in the House and Senate springs from a common concern: while existing laws such as the Clean Water Act and the Coastal Zone Management Act contain very important (and often under-utilized) tools for controlling and eliminating coastal pollution, the arsenal of laws needs to be fortified. Stronger laws, focused on critical coastal degradation problems and on protecting still-unspoiled resources, could help to stem the tide of degradation before it is too late. We hope this Subcommittee will take swift action to see that these laws are strengthened.

The testimony that follows outlines some key sources of coastal contamination which we believe require legislative action, and the harms that this contamination is causing. It then suggests some important steps we can take to improve the likelihood of success in the battle for the coasts, and offers some thoughts on the legislation that has been referred to this Subcommittee and on bills pending in the Senate.

I. The Problem

Population Pressures: According to the Council on Environmental Quality, "[m]ost major American urban centers are located on the Pacific, Atlantic, Gulf and the Great Lakes coasts, and growth in these coastal populations continues to accelerate. Population in coastal counties increased by 61% between 1950 and 1980 and is still growing rapidly. In 1984, over one half (52.3%) of the residential population lived within 50 miles of a coastline."[9] The myriad activities of this dense population all contribute to coastal degradation. Each source of contamination individually may take only a relatively minor toll, but the incremental, cumulative impacts of so many people living, manufacturing, recreating and disposing of their wastes in coastal areas has brought us to the current crisis.

Poison Runoff from Development: When it rains, runoff from farms, construction sites and city streets carries water laden with pesticides, excess nutrients, sediment and toxic contaminants into our waters. According to EPA's 1986 water quality inventory, almost half of the Nation's polluted estuaries are contaminated primarily by this poison runoff.[10] And more recent data suggest that the poison runoff problem may be even more significant. In EPA's recently compiled list of over 17,000 heavily polluted waters nationwide, less than 600 were contaminated by point sources alone.[11]

The threats to coastal waters due to poison runoff from coastal residential development include sediments, harmful bacteria, nutrients such as nitrogen and phosphorous, and toxics from urban runoff. Sediments from construction sites or streambed scouring can destroy bottom habitats and smother submerged vegetation. Nutrients can cause eutrophying excess algae growth, which depletes oxygen and literally chokes the life out of coastal waters. For example, a seemingly benign residential development of 2,400 dwelling units on 400 acres of land could generate 277 pounds/year of phosphorous, and 2,130 pounds/year of nitrogen in runoff.[12] Toxins in urban runoff also pose a threat to aquatic life and human health. EPA has found at least 76 different toxic pollutants in urban stormwater.[13] Urban runoff can rival factory pollution as a source of toxic contamination. For example, NRDC has estimated that in Baltimore, from January through October of 1989, 90,500 pounds of zinc, 17,200 pounds of copper and 5,800 pounds of lead were carried into Baltimore's streams and Harbor -- and then into the Chesapeake Bay -- by poison runoff.[14] This tally represents six times as much zinc and almost as much copper and lead as was discharged by Baltimore manufacturers into the Harbor in all of 1988.[15]

Agricultural activities in coastal areas also contribute significant pollution. NOAA estimated, for example, that in 1982 5,290,000 pounds of pesticides were applied in the Chesapeake Bay drainage area; 2,132,000 pounds were applied in Albemarle Sound's drainage area, and 1,547,000 pounds were applied in the Delaware Bay drainage basin.[16] These applications contribute large quantities of pesticides and herbicides, including chlorinated hydrocarbons, to coastal waters.[17]

Point Source Discharges: Despite important gains in wastewater treatment made over the past twenty years, industrial and municipal wastewater discharges in the coastal zone continue to be major sources of degradation. Each year, industrial facilities discharge nearly five trillion gallons of wastewater into coastal and near-coastal waters. Another 3.6 trillion gallons of wastewater from sewage treatment plants are discharged into these waters each year.[18]

Combined Sewer Overflows: Discharges from combined sewer overflows (CSOs) into coastal waters also are a significant source of water pollution. In many older coastal cities combined sewer systems carry both stormwater and sanitary sewage. During rainfall events, these systems become overwhelmed with the volume of wastewaters, and "regulators" divert untreated raw sewage, combined with untreated stormwater and industrial wastes, directly into receiving waters.

The impact of CSOs is significant. EPA estimates that there are between 15,000 and 20,000 CSO discharge points currently in operation.[19] About 2300 are located in coastal counties.[20]

New York Harbor is a case in point. Close to 500 CSO points release 560 million gallons of untreated sewage and other wastes during an average 7-hour storm.[21] In 1984, EPA estimated that combined sewer overflows contained over 7 million pounds of toxics per year.[22]

Hazardous Waste Sites: Twenty-eight percent of all the hazardous waste sites in the nation (including 35% of the National Priorities List sites) are in coastal areas[23] where they can threaten public health and aquatic life through ground and surface water contamination and sediment contamination.

Contaminated Underwater Sediments: According to a 1989 report by the National Research Council "sediment contamination is widespread throughout U.S. coastal waters and potentially far reaching in its environmental and public health significance."[24] All of the nation's saltwater coasts, as well as the Great Lakes, are experiencing problems from in-place sediment contamination.[25] In the U.S. portion of the Great Lakes alone, 27 areas have been identified as having significant contaminated sediment impairments.[26]

Dumping of Contaminated Dredged Spoils: While dredging of harbors and channels is necessary to keep ports open, the impact of the disposal of contaminated dredged material on coastal waters cannot be ignored. Each year the Army Corps of Engineers disposes of over 180 million metric tons of dredged materials from harbor and channel dredging operations into marine waters -- over half of it into estuaries.[27] A significant percentage of this material is highly contaminated with toxic materials, including pesticides, heavy metals, PCBs and oil.[28]

II. Impacts of Coastal Pollution

Coastal pollution takes its toll on recreation and tourism, on the fishing and shellfishing industry, on human health and on our aquatic resources.

Polluted Beaches: The summer of 1988 brought numerous instances of beach closures due to sewage contamination and medical wastes that washed up on shore. Beach closures cost the States of New York and New Jersey an estimated $2 billion in tourism dollars in 1988,[29] and over 100 miles of beaches in these two States alone were closed due to medical waste wash-ups in 1987 and 1988.[30] During the summer of 1989 there were over 575 beach closures[31] in New York, New Jersey and Connecticut alone due to sewage contamination.[32]

Bathing in sewage-contaminated waters can cause a variety of illnesses such as gastroenteritis. Skin ailments also can result from contact with sewage-contaminated waters.

Contaminated Seafood: More than seventy percent of commercially important species of fish and shellfish depend on coastal areas as habitats.[33] Contamination of marine and Great Lakes waters and sediments has led to significant losses of our commercial and sport fisheries resources.

Shellfish, including oysters, mussels and clams, are especially vulnerable to contamination from toxic metals such as lead, mercury, cadmium and chromium. These metals can cause a range of adverse health effects in humans, such as kidney and central nervous system damage and birth defects in unborn fetuses. Many cancer-causing industrial chemicals such as PAH's, petroleum hydrocarbons, dioxins and PCBs also have been found in seafood. The National Oceanic and Atmospheric Administration (NOAA) reported recently that, based on an examination of shellfish growing waters in over 100 estuaries, in 1985, 35% of the waters were not approved for harvest.[34] But of the waters approved for harvest in the three largest East Coast estuaries (Chesapeake Bay, Pamlico Sound and Long Island Sound), almost half of the acreage classified for harvesting is not productive.[35] In Mobile Bay, Alabama; the Connecticut River, Connecticut; Charleston Harbor, South Carolina, and Grays Harbor, Washington, 100% of all productive shellfish waters were harvest limited in 1985 because of contamination.[36]

Fish contamination is not restricted to our saltwater coasts. Since the early 1970's residents of the Great Lakes have been cautioned to restrict their consumption of locally-caught lake trout, salmon, and other fish because of high levels of PCBs.[37] In 1989 the National Wildlife Federation published a guide analyzing the level of human health risk posed by eating various Lake Michigan sport species. The guide reported that, to achieve a 1 in 1,000,000 lifetime cancer risk level from exposure to toxic contaminants in fish, the consumer could eat: no lake trout greater than 20 inches; no chinook salmon greater than 30 inches; only one meal in a lifetime of brown trout, 10-20 inch lake trout, 10-30 inch chinook salmon, coho salmon or walleye; and four meals in a lifetime of yellow perch.[38]

Bacteria and viruses such as Salmonella, Staphylococcus and Vibrio bacteria, as well as the hepatitis virus, can be contained in the sewage that contaminates our coastal waters, and can make shellfish unsafe for human consumption. For example, in recent years 15 percent of tidal zones in Casco Bay, Maine have been off limits for clams and mussels because of sewage contamination; in 1985, 57% of waters in the Gulf of Mexico were closed periodically or permanently.[39]

Ecosystem Destruction: Chemical contamination and eutrophication hurt marine life and Great Lakes ecosystems. While these profound injuries to natural resources may have no immediate impacts on our pocketbooks or vacation plans, they threaten the long-term health of the planet and make the possibility of full-scale recovery more remote.

Particularly for non-migratory, bottom-feeding fish who dwell in areas with contaminated bottom sediments, fish may exhibit a variety of abnormalities including liver tumors, fin erosion and cancerous lesions.[40] In marine and estuarine waters, some of the fisheries exhibiting high rates of tumors include English sole in Puget Sound; winter flounder in Boston Harbor and Long Island Sound; starry flounder in San Francisco Bay; white croakers off the coast of Los

Angeles; white perch in the Chesapeake Bay, and brown bullhead in Lake Erie and Delaware Bay.[41]

In the Great Lakes, research indicates that at least 15 predator species from the top of the Great Lakes food chain -- including bald eagles, osprey, cormorants, mink and otters -- have exhibited widespread reproductive problems, population declines or other problems associated with toxic chemicals in the ecosystem.[42]

Populations of bald eagles in the Great Lakes region have rebounded since the ban on DDT in the early 1970's. However, eagles nesting within five miles of the shores of the Great Lakes are much less successful in reproducing than inland birds, because of high levels of PCBs and other chemicals in the fish they eat.[43]

Perhaps most troubling of all, a study of babies born to 242 women who ate two to three meals per month of Great Lakes fish found that their infants had smaller head size, weighed less and were born at a shorter gestational age than a control group. When the children were retested at age seven months and four years, they performed less well on neurological development and short term memory tests than did their peers.[44]

Over the years we may have grown inured to the idea that once-productive shellfish harvesting areas and fishing grounds are "off limits" due to pollution, that beaches we loved when we were children are too dirty for our own children to enjoy, and species we admired will become extinct. But that is a mistake. Our precious coastal heritage can and must be restored and protected for future generations. One important means for restoring it is through stronger federal legislation. We urge this Subcommittee to consider the following steps we can take to stem the tide of coastal pollution:

III. Legislative Action to Protect and Restore our Coasts

Existing law contains many important authorities which, if used to their fullest (as Congress intended), would go a long way toward solving our coastal pollution problems. Indeed, some of us have been harsh critics of EPA's failure to implement the Clean Water Act in a manner consistent with Congress' intent.[45]

But there remain a number of areas in which additional legislation could provide added impetus for coastal protection that is badly needed. It is on these areas that we ask the Subcommittee to focus its attention.

Some have raised the issue of whether it is appropriate to draft legislation aimed "only" at our coasts -- whether it runs counter to the general national approach taken by the Clean Water Act. We think that coastal legislation is appropriate, and that it will strengthen rather than weaken the Clean Water Act both in the short term and the long term.

It makes sense to focus our efforts on the coasts because these are the areas under greatest stress from population and development pressures. Reports such as the OTA Report strongly support the notion that the coasts -- so critical to our livelihoods, food supplies and recreational opportunities -- need special help immediately if they are to recover and flourish.

Moreover, we see strengthening of the Clean Water Act's provisions to protect the coasts as a good place to begin as we consider whether the law as a whole should be strengthened in the next reauthorization cycle. Lessons learned in coastal areas can be applied, where appropriate, to the rest of the United States when the law as a whole is revisited.

Target Efforts to Protect Threatened Waters and Restore Degraded Waters: We need to target protection and control actions to degraded and threatened coastal resources: those waters that have been identified as contaminated (under the various identification programs of secs. 303(d), 304(l), 319 and 320 of the Clean Water Act) should be targeted for added controls; waters eligible for designation as Outstanding National Resource Waters should be so designated, and should be protected through full implementation of antidegradation rules and poison runoff controls.

We therefore support the provisions in the various bills now in the House and Senate aimed at identification of critical coastal areas where stronger protections (discussed below) will apply.

We also urge you to consider adopting a classification program whereby States would be required to designate as Outstanding National Resource Waters (ONRW) those waters within their States that are in or adjacent to national parks or wildlife refuges; state parks; recreation areas or wildlife preserves; in a National Marine Sanctuary or Estuarine Reserve; shellfish growing or fish spawning waters of particular significance, and other waters of outstanding ecological significance, unless they make a determination that such designation is not appropriate. This approach would allow the States to retain flexibility, while shifting the burden of proof in favor of ONRW designation for important resources.

Use the Law to Link Land Use to Coastal Water Quality: Last year NRDC published Poison Runoff: A Guide to State and Local Control of Nonpoint Source Water Pollution. This major study makes specific recommendations about effective ways to structure poison runoff control programs. Among the key recommendations of Poison Runoff is that programs be geared towards compliance with water quality standards, and be based on the link between land use and water quality.

One logical means for injecting consideration of water quality impacts into the coastal development process would be to require that the State water quality agency certify to the State or local agency issuing a permit for any major development or activity that could result in a discharge to coastal waters, that the development or activity will not violate or contribute to the violation of State water quality standards within the coastal zone. Under this type of approach, the State's water quality management agency would retain -- and be required to exercise -- its expertise and authority to ensure that development in the coastal zone was undertaken only if water quality could be protected.

We welcome an analogous proposal in the Senate legislation to require State sec. 401 certification of compliance with water quality standards before a Federal flood insurance policy could be issued or renewed;[14] but the concept should be expanded to cover all major land use activities in the coastal zone, and not just those projects that apply for Federal flood insurance. In our view, this same principle should be applied more broadly to all Federal licenses, permits or grants of funds.

We further recommend that this 401 certification approach be developed in a manner that requires consideration of cumulative water quality impacts due to incremental development in the area of the coastal zone. A mandate to look ahead and consider the cumulative effects of reasonably foreseeable development, along with existing development, would be a major spur towards comprehensive water quality management and planning.

We also strongly support the proposal in the Coastal Defense Initiative to require EPA to develop guidance on "Enforceable Pollution Control Measures" -- in effect, technology-based standards for Best Management Practices to control poison runoff -- which the State would be required to implement in designated-degraded coastal areas. EPA officials have stated during hearings on the CDI that they can develop such guidance, and the agency appears to share our view that the technology-based approach makes sense for BMPs in degraded or threatened areas.

Finally, the Senate legislation proposes to link formally the goals of the U.S. Department of Agriculture's Conservation Reserve Program to the Clean Water Act's water quality and coastal protection goals, which is an approach we endorse. It is entirely appropriate that limited tax dollars in the CRP be targeted to further water quality protection goals. We support the creation of a statutory mechanism whereby the Secretary of Agriculture will work directly with the EPA Administrator to ensure that Conservation Reserve Program funds are administered to advance poison runoff control objectives, including those cases where the benefits realized are not purely in the form of erosion control.

Stricter Point Source Controls in Degraded and Threatened Waters: Although the provisions of the 1987 Water Quality Act amendments helped to focus attention and cleanup efforts on "toxic hotspots," the evidence indicates that our coastal waters are still beset by massive volumes of point source discharges. We therefore support strengthening controls on point source discharges to degraded and threatened waters. The proposed Senate legislation creates a new requirement for industries wishing to discharge to designated-degraded waters: permits could be issued or renewed only if the discharger demonstrated that there was a "need to discharge" after implementing all available pollution prevention and waste minimization practices. This concept is an important one. It will move us closer to the Clean Water Act's zero discharge goal, and will help to set the stage for more stringent effluent guidelines on a national scale by stimulating innovative technological solutions to wastewater treatment challenges.

Current Clean Water Act antidegradation regulations require that discharges to waters that meet or exceed water quality standards -- i.e., still-pristine waters -- not degrade water quality unless and until the "State [has assured, among other things,] that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources...." 40 CFR §131.12(a)(2). If a means exists for a discharger into high quality waters to reduce its pollutant load via waste minimization, antidegradation requirements would mandate that it be implemented.

While the existing law thus already imposes a requirement that discharges to high quality waters be controlled to the highest level, experience has shown that the antidegradation rules are not widely followed. We therefore urge that the "need to discharge" approach discussed above be applied to discharges to all coastal waters, and not simply designated-degraded waters. It is far better to protect our high quality waters now than it is to wait until they have become degraded before imposing adequate controls. Moreover, from a technological standpoint, a discharger may be better served by having waste minimization requirements in place at the outset so that appropriate equipment and product design can be selected. A subsequent retrofit to meet more stringent requirements (if waters later become degraded or new pollutant sources place further stresses upon receiving waters) could prove costlier and could achieve less pollution control.

Improve Controls on Stormwater Discharges: Under the mandate of the 1987 amendments to the Clean Water Act,[47] EPA was to have issued stormwater permit regulations for municipal separate storm sewer systems serving populations of over 250,000 by no later than February 1989. The Agency finally did publish proposed regulations,[48] but they are severely flawed. EPA proposes in the draft rule to redefine "municipality" to include only incorporated municipal entities. Under this narrow proposal, only about twenty-five percent of the U.S. population overall would be covered by the rule, as opposed to sixty-six percent if the proposal were broadened to include populous counties.[49] Many of the nation's important high-growth areas, frequently clustered on the coasts, would be excluded under this proposal: none of Long Island would be covered; the vast majority of New Jersey's heavily populated coastal counties would be unprotected; action would be required in the District of Columbia, but not in Montgomery County, Maryland or Arlington County, Virginia.[50]

This misguided EPA proposal has not been finalized into a rule as yet, so there is still time to influence it. The Senate legislation contains a proposal that would apply the stormwater permitting requirements to all coastal areas that are adjacent to designated-degraded waters. This legislative approach would discourage EPA from going forward with the narrow "incorporated municipality" approach by emphasizing, yet again, that Congress wants contaminated urban stormwater to be controlled and treated as quickly as possible.

Another major deficiency in EPA's proposed stormwater permit application regulations is that they lack any specific minimum treatment standards which a discharger would have to meet in order to obtain a permit. In other words, the proposed rules offer a "shell" calling for the submission of permit applications, but are silent on the level of treatment required. This "write your own permit" program could result in only minimal coastal water quality gains.

To fill this vacuum, we urge Congress to specify in a coastal stormwater permitting provision some of the key permit elements (including both treatment requirements, such as definitions of acceptable treatment levels or pollutant reductions, and programmatic elements, such as adequate authority and financial resources to issue and enforce permit limits) to be included in the permits that would be issued to municipalities and industries discharging stormwater into degraded coastal waters.

Eliminate Untreated Discharges from Combined Sewer Overflows: CSOs are a major cause of water quality problems in coastal areas, particularly beach closures and shellfishing bans due to bacteriological contamination. Combined sewer overflow points constitute point source discharges that today are subject to the permitting requirements of the Clean Water Act.[51] But today many CSOs remain completely unregulated and efforts to eliminate the discharges or to provide adequate wastewater treatment lag far behind the control of sewage from other sources.

We strongly support enactment of legislation that mandates the elimination of CSO discharges by a date certain, and requires EPA to promulgate regulations setting out the technology for eliminating such discharges. The Coastal Defense Initiative fails to tackle this difficult problem, and we urge this Subcommittee to play a leadership role in adopting a strong CSO elimination program.

It is important that marine CSO elimination legislation establish timetables for action that require elimination of untreated discharges as expeditiously as possible. The assessment, control strategy and implementation timetable of the 1987 Water Quality Act's toxic hotspot provision, now section 304(l) of the Clean Water Act, calls for full implementation of control strategies within 5 years from the date of enactment. We urge a similar timetable for coastal CSO elimination.

All Coastal Sewage Discharges Should Receive at Least Secondary Treatment: Our coastal and marine waters cannot, as some once believed, serve as a dumping ground for "assimilation" of society's wastes. In light of the current state of knowledge and concern over cumulative stresses on marine water quality, it is appropriate to reconsider the validity of the Clean Water Act's 301(h) waiver, under which municipalities can obtain a waiver from the secondary treatment requirements of section 301(b) and can discharge sewage wastewater that receives only primary level treatment.[52] The time has come to phase out the waiver, and to require that all coastal POTW discharges achieve secondary treatment levels.

First, the 301(h) waiver is grounded in the outmoded concept that the ocean can assimilate sewage without suffering ill effects. But evidence is growing that the cumulative effects of the discharge of inadequately treated sewage, taken together with the many other stresses placed on marine waters, is taking its toll. As the OTA Report correctly frames the issue:

> From a policy perspective, prohibiting [301(h)] waivers in the future could be justified because of the overall extent of pollutant inputs from many sources into estuaries and coastal waters and the expected trend of degradation in many of these waters.[53]

Second, we are deeply concerned about the toxic content of sewage treatment plant effluent which has not been given secondary treatment. Even though section 301(h) requires that pretreatment program requirements be met by industrial dischargers to the POTW which has a secondary treatment waiver, pretreatment standards generally are set based on an assumption that the industrial wastewaters will go on to receive full secondary treatment at a well-operated POTW. Hence, even where all applicable pretreatment requirements are met by the industrial dischargers -- and evidence suggests that in many cases, pretreatment requirements are not met, but are flouted with impunity[54] -- the 301(h) secondary treatment waiver may pose a significant toxics threat to receiving ocean waters.

In sum, we urge the enactment of language that would phase out the availability of 301(h) waivers for all POTWs. At a minimum, additional controls on toxic discharges to POTWs without secondary treatment, such as a requirement that industrial dischargers to such plants meet Best Available Technology effluent limits rather than Pretreatment limits, should be considered.

National Water, Sediment and Wildlife Quality Standards: Water quality criteria are central to the Clean Water Act's monitoring, protection and regulatory scheme. First, criteria define for the public, the regulators and the regulated community what levels of water quality will protect human health and the aquatic environment. It is through the process of establishing water quality criteria that citizens can have their say about the level of water quality they want in their rivers, lakes and coastal waters. Second, criteria are the benchmarks against which water quality-based permits must be measured. Third, water quality criteria are essential to the effective and systematic assessment of state water quality status and trends.

For years, as Congress recognized in enacting the 1987 CWA amendments, many States have lagged behind in adopting numerical water quality criteria for toxic pollutants. They relied on their narrative standards prohibiting the presence of toxic substances in toxic amounts. The lack of numerical criteria was an obstacle to NPDES permitting, and discouraged States from monitoring for pollutants for which no criteria had been adopted. As Senator Chafee put the issue during floor debate on the 1987 amendments,

> Narrative criteria, implemented through biomonitoring, may be successful in expeditiously identifying and limiting toxic discharges on a broad scale.... However, in developing toxic criteria EPA and the States cannot exclusively depend on narrative criteria [i.e., "no toxic in toxic amounts"] as the primary means to combat toxic hazards."[55]

Since enactment in 1987 of the requirement that each State adopt numerical criteria for each priority toxic pollutant for which EPA has published a criteria document and that could reasonably be anticipated to be found in the State's waters, significant improvements in state water quality standards have begun to be made.[56] But progress should not stop here. There remain significant gaps in the criteria developed thus far by EPA, as well as in the individual States' adoption of criteria.

Both the CDI and the Senate legislation contain provisions aimed at improving water quality criteria and standards, and we urge this Subcommittee to consider legislating in this area.

Water column criteria and standards do not alone achieve the goals of the Clean Water Act. There is a clear need for sediment quality and biological criteria to help define and protect the health of aquatic ecosystems. Despite the overwhelming evidence of the damage from toxic chemicals that top-level predators and other wildlife in the Great Lakes[57] and elsewhere are suffering, the States have not set water quality standards to protect wildlife from toxic contamination in the food chain,[58] nor has EPA published water quality guidelines to protect wildlife. EPA has been struggling with the development of such criteria for some time, and a legislative mandate to move forward would help to ensure that adequate EPA resources are devoted to the effort. We therefore urge this Subcommittee to consider establishing a specific mandate.

Second, it makes sense that consistent, scientifically sound standards be set for coastal waters and the Great Lakes that are by nature multi-state. Particularly when toxic and persistent bioaccumulative pollutants are in issue, we need national standards that protect the public and aquatic ecosystems. It makes no sense that a perch caught off the coast of Maine could hypothetically subject the person who eats it to a one hundred-fold greater cancer risk due to toxic contamination, than a perch caught off the coast of New Jersey. Yet, that is what the present water quality standard-setting approach allows. In our view, all citizens are entitled to a consistent, adequate minimum level of protection.[59]

Address the Challenge of Contaminated Sediments: EPA has begun to examine remediation and regulatory approaches to deal with the problem of contaminated sediments, but we believe that a more concerted and aggressive program is needed. Recently a national coalition of 235 environmental, fishing, labor, health and other groups proposed a Citizens Charter on contaminated sediments. The groups made the following recommendations, which we urge this Subcommittee to address through legislation:

We should establish a governmental Task Force headed by EPA, in cooperation with other Federal agencies with roles to play in sediment contamination assessment, dredging and remediation. The Task Force should undertake a national survey of contaminated sediment problems, first based on available information and then updated periodically as new data and assessment techniques become available. Moreover, the Task Force must serve as the focal point for the development of national sediment quality criteria which take into consideration ecological, wildlife and human health impacts of sediment contamination. The criteria should form the basis for measuring the effectiveness of remediation; establishing point and non-point source controls; assessing the health of water bodies, and determining and regulating the impact of the disposal of dredged materials at ocean and Great Lakes dumpsites.

Under the leadership of EPA, a national program to direct the removal or remediation of in-place contaminated sediments should be instituted. The Great Lakes and the marine coasts need to undertake demonstration projects aimed at developing innovative solutions to in-place contamination problems, and legislation should establish a demonstration program.

It is imperative that we begin now to phase out the open water disposal of contaminated sediments. We advocate legislation that establishes a goal of ending the disposal of all contaminated dredged materials in twenty years, beginning now with a five percent per year reduction in the volume of such disposal. This long lead time will give us ample time to adopt pollution prevention and poison runoff control programs that will stem the tide of more contaminated sediment deposition in our ports and channels, while at the same time providing the impetus needed to bring about pollution prevention innovations.

Conclusion

Coastal pollution comes from many sources, all of which must be controlled effectively if we are to restore the health of our coastal waters. Most particularly, while refining existing tools to control point sources, we must increase our attention to those diffuse sources that have escaped effective controls in the past and turn our attention to in-place sediment contamination problems.

1. The Natural Resources Defense Council (NRDC) is a national environmental organization with over 130,000 members. NRDC is dedicated to the wise use and conservation of our natural resources, and to the protection and rejuvenation of the environment for this and future generations. NRDC's interest in the protection of water quality and coastal resources dates back to the organization's founding in the early 1970's.

2. The National Wildlife Federation (NWF) is the nation's largest not-for-profit conservation organization, with over 5.8 million members or supporters. Contamination of fish, waterfowl, and wildlife, and the threat posed to human health by such contamination, is of particular concern to NWF, in part because many of its members are anglers and hunters. Since 1982, NWF's Great Lakes Natural Resources Center, in Ann Arbor, Michigan, has operated a program of scientific research, litigation, education and advocacy focused on toxic chemical contamination problems in the Great Lakes.

3. The Coast Alliance is a national coalition of concerned activists who work to protect all four of the nation's coasts.

4. The Environmental Defense Fund (EDF) is a national environmental research and advocacy organization with more than 150,000 members in all 50 States. EDF promotes environmentally and economically sound waste management practices that emphasize maximum reduction in the release of toxic substances to the environment.

5. The American Oceans Campaign is a national public interest organization devoted to protecting our coastal and ocean resources.

6. Waste in Marine Environments, U.S. Congress, Office of Technology Assessment (April, 1987) (hereafter "OTA Report") at 3.

7. Id. at 7 (emphasis supplied).

8. The problems plaguing our Great Lakes coasts also are severe, and the analysis and recommendations contained in this testimony also apply to the Great Lakes.

9. Council on Environmental Quality, "Environmental Trends," Executive Office of the President, Washington, D.C. (1989) (hereafter "Environmental Trends") at 124.

10. National Water Quality Inventory, 1986 Report to Congress, EPA-440/4-87-008 (November 1987) at 3.

11. The list was compiled under the requirements of sec. 304(l) of the Clean Water Act. (Waters were not broken down by inland versus coastal categories.)

12. Natural Resources Defense Council, "Ebb Tide for Pollution: Actions for Cleaning Up Coastal Waters" (1989) (hereafter "Ebb Tide") at 15.

13. Results of the National Urban Runoff Program, Vol. I - Final Report, U.S. EPA WH-554/Water Planning Division (1983). The study detected 13 metals and 63 organics in stormwater runoff. Id.

14. D. Cameron, "NRDC's Poison Runoff Index for Baltimore: Estimates of Selected Pollutants in Urban Stormwater Runoff Compared to Point Source Loadings" (1989) at Summary.

15. Id.

16. Pait, Anthony S. et al., "Agricultural Pesticide Use in Estuarine Drainage Areas: A Preliminary Summary for Selected Pesticides"; National Oceanic and Atmospheric Administration, Strategic Assessment Branch (January 1989) at 16.

17. OTA Report, supra n. 6, at 75.

18. OTA Report, supra n. 6, at 70.

19. EPA, "Interim Final National Combined Sewer Overflow Control Strategy," Jan. 27, 1989 (hereafter CSO Strategy) at 1.

20. Al Reilly, "Marine CSOs: The Problem and the Solution," unpublished paper, 1988, at 2.

21. Report to Congress, March 1989, on the New York Bight Plastics Study, Section 2302, Subtitle C of the Marine Plastic Pollution Research and Control Act of 1987, Title II of the United States-Japan Fishery Agreement Approval Act of 1987, PL 100-220, at 10.

22. Combined Sewer Overflow Toxic Pollutant Study, EPA, April 1984, at 70.

23. Statement of Charles N. Ehler, Director, Office of Oceanography and Marine Assessment, National Oceanic and Atmospheric Administration, before the Superfund, Oceans and Water Protection and Environmental Protection Subcommittees of the Senate Committee on Environment and Public Works, July 12, 1989, reprinted in S. Hrg. 535, 101st Cong. 1st Sess. (hereafter "NOAA Testimony") at 62.

24. Contaminated Marine Sediments -- Assessment and Remediation; National Research Council, Committee on Contaminated Marine Sediments, Marine Board, Commission on Engineering and Technical Systems; National Academy Press, Washington, D.C. (1989).

25. For a discussion of some specific contaminated sites, see "Statement of Beth Millemann, Executive Director, Coast Alliance, before the Subcommittee on Oversight and Investigations and the Subcommittee on Oceanography and the Great Lakes, Committee on Merchant Marine and Fisheries, concerning Contaminated Marine Sediments," March 3, 1990.

26. Lake Michigan Federation, "A Citizen's Guide: Cleaning Up Contaminated Sediment" (Chicago, 1989).

27. OTA Report, supra n. 6, at 61-62.

28. Ebb Tide, supra n. 12, at 16.

29. See generally Douglas D. Ofiara and Bernard Brown, "Marine Pollution Events of 1988 and Their Effect on Travel, Tourism, and Recreational Activities in New Jersey," Bureau

of Economic Research, Rutgers University, and Marine Fisheries Administration, Fish, Game, and Wildlife, New Jersey Department of Environmental Protection (March 21, 1989).

30. Testimony of Dr. R. Lawrence Swanson, Marine Science Research Center, SUNY Stony Brook, New York, before the U.S. House of Representatives, Committee on Merchant Marine and Fisheries, Subcommittee on Fisheries and Wildlife Conservation, concerning Coastal Pollution (Sept. 6, 1988) at 2.

31. Each day a beach was closed is measured as one beach closure.

32. Bureau of Monitoring Management, New Jersey Department of Environmental Protection, Cooperative Coastal Monitoring Program Report, 1989; New York State Department of Health, Bureau of Community Sanitation and Food Protection, New York State (excluding New York City) Beach Closings 1988-1989 Summary Report; State of Connecticut Department of Health Services, Preventable Diseases Division, Summary of Reported Beach Closures for 1989.

33. Ebb Tide, supra n. 12, at 5.

34. NOAA Testimony, supra n. 23, at 68.

35. Id.

36. "Environmental Trends," supra n. 7, at 43-44.

37. Ebb Tide, supra n. 12, at 6.

38. "Lake Michigan Sport Fish: Should You Eat Your Catch?" National Wildlife Federation, Lake Michigan Sport Fish Consumption Advisory Project (1989) at 7.

39. Ebb Tide, supra n. 12, at 9.

40. Id.

41. Id.

42. Colborn, T.E. et al., Great Lakes: Great Legacy?, Conservation Foundation/Institute for Research on Public Policy (1990) at 131-159.

43. Council of Great Lakes Research Managers/International Joint Commission, "Proceedings of the Workshop on Cause-Effect Linkages," Gilbertson, M., ed., (March 28-30, 1989) at 45.

44. Jacobson, J.L. et al., "Effects of in utero exposure to polychlorinated biphenyls and related contaminants on cognitive functioning in young children," Journal of Pediatrics (Jan. 1990) at 38-45.

45. See, e.g., "Scorecard on Clean Water: Performance of the U.S. Environmental Protection Agency in Complying with the 1987 Water Quality Act," Natural Resources Defense Council (May 1, 1989).

46. The Senate legislation would require that any applicant for federal flood insurance for an activity that would result in a discharge of pollutants or pollution, obtain 401 certification that the activity would not violate water quality standards adopted pursuant to the Clean Water Act.

47. Section 405 of the 1987 Water Quality Act created sec. 402(p) of the Clean Water Act, pursuant to which operators of municipal separate storm sewer systems serving a population of 250,000 or more were to apply for permits within 3 years and obtain them within 4 years.

48. Although final regulations were due in February 1989, EPA now does not plan to complete them before summer of 1990.

49. The Clean Water Act defines "municipality" very broadly, to include a "city, town, borough, county, parish, district, association or other public body ... having jurisdiction over disposal of sewage, industrial wastes, or other wastes...." Clean Water Act Sec. 502(4).

50. For a more detailed discussion of the gross deficiencies in EPA's proposed stormwater regulations, see "Comments of the Natural Resources Defense Council, Inc. on EPA's Proposed NPDES Application Regulations for Stormwater Discharges, 53 Fed. Reg. 49416 et seq." (March 7, 1989).

51. EPA's National Control Strategy for Combined Sewer Overflows restates this principle clearly. CSO Strategy, supra n. 19, at 2.

52. There are 48 facilities with approved 301(h) waivers; another nine have received tentative approval. (Figures supplied by EPA to NRDC, as of February 9, 1989.)

53. OTA Report, supra n. 6, at 232.

54. A recent General Accounting Office study found major deficiencies in the implementation of the pretreatment program, particularly in the area of enforcement of existing standards. See "Improved Monitoring and Enforcement Needed for Toxic Pollutants Entering Sewers," GAO/RCED-89-101 (April, 1989). For a more complete discussion of this issue, see "Testimony of the Natural Resources Defense Council, Inc. before the Subcommittee on Environmental Protection of the Senate Committee on Environment and Public Works," June 16, 1989, at 9-13.

55. 131 Cong. Rec. S8005 (remarks of Sen. Chafee on S. 1128) (daily ed. June 12, 1985).

56. See "Status Report: State Compliance with CWA Section 303(c)(2)(B) as of February 4, 1990," U.S. EPA, Office of Water Regulations and Standards (April 17, 1990).

57. Colburn, T.E., supra n. 42, at 131-159.

58. One State that we are aware of, Wisconsin, has developed a water quality standards procedure and several numeric criteria to protect wildlife. Minnesota has proposed water quality standards to protect wildlife.

59. A State would be free to adopt a more protective standard under the proposed legislation, as is the case under current law. Moreover, site-specific standards also would be allowed so long as they were based on scientific evidence that a different standard was appropriate and equally as protective.

TESTIMONY OF
DR. HOWARD LEVENSON
OCEANS AND ENVIRONMENT PROGRAM
OFFICE OF TECHNOLOGY ASSESSMENT

BEFORE
THE SUBCOMMITTEE ON WATER RESOURCES,
THE HOUSE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

ON
"COASTAL POLLUTION PROBLEMS"

MAY 10, 1990

Mr. Chairman:

I am Howard Levenson, the project director for the Office of Technology Assessment's 1987 report on marine pollution, entitled *Wastes in Marine Environments*.[1]

OTA's major technical finding was that many U.S. estuaries and coastal waters will continue to degrade or begin to do so during the next few decades unless additional protective measures are taken. From a policy perspective, the major questions that we raised were whether all "needy" waterbodies will receive adequate management, and whether existing and planned mechanisms at all governmental levels will be used effectively to provide such management.

Although positive steps have been taken since OTA's report was released, our conclusions have not changed -- indeed, events during the last few years have confirmed them. Moreover, on a global scale, a report issued earlier this year by the United Nations Environment Programme concluded that "encroachment on coastal areas continues worldwide ... [i]f unchecked, this trend will lead to global deterioration in the quality and productivity of the marine environment."

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[1] The assessment was requested by the House Committees on Public Works and Transportation and on Merchant Marine and Fisheries.

In this testimony, I first will describe the seriousness and extent of the problems in U.S. coastal waters, with emphasis on how they differ from our inland waters. Then I will examine the adequacy of current U.S. management strategies, what a more protective approach might look like, and how the legislation being considered today supports such an approach.

THE PROBLEMS

Coastal waters, including estuaries, have been used -- some say abused -- for years by coastal communities and industries for the disposal of various wastes (e.g., municipal sewage effluent and sludge, industrial effluent, dredged material). Such disposal, whether via dumping or pipeline discharge, has been relatively cheap and has often been the preferred short-term approach.

At the same time, coastal waters are the most important of all marine environments with respect to their commercial resources, recreational uses, and ecological roles. They provide habitat during critical portions of the lifecycles of roughly two-thirds of the fish and shellfish caught in U.S. marine waters -- this fact alone distinguishes them from freshwater lakes and rivers. The value of marine commercial and sport fishing has been estimated at over $10 billion, and tourism and other recreational pursuits in the associated shoreline areas is the lifeblood of many communities. As a result, individual citizens and fishermen, towns, and county and State governments have grown increasingly concerned about the impacts of waste disposal on harvests and tourism and on the property values of real estate located near these waters.

The OTA report documented numerous adverse effects around the country of such waste disposal:

o low dissolved oxygen levels leading, for example, to fish kills;

- contamination of shellfish with microorganisms, leading to restrictions on about one-third of our productive shellfish areas;
- contamination of shellfish, fish, birds, and mammals with metals and organic chemicals, in some cases leading to ulcers and tumors;
- declines in submerged aquatic vegetation;
- contamination of sediment with metals and organic chemicals;
- restrictions on fishing and consumption of certain fish species;
- restrictions on swimming; and
- increased reporting of human diseases such as viral gastroenteritis.

The degree and distribution of these impacts have varied widely among different waterbodies and organisms, but no region of the country has been immune to serious impacts. Public attention has focused mostly on the northeastern United States (e.g., the Chesapeake Bay and the New York Bight), southern California, and Puget Sound. Serious effects, however, also have occurred or are beginning to occur in the less-publicized (and relatively less-studied) Gulf of Mexico and along the southern Atlantic coast.

As a result, OTA concluded that without additional protective measures, the next few decades will witness new or continued degradation in many estuaries and some coastal waters around the country, even in some that showed improvements in the past.

OTA also concluded that on a national scale, industrial and municipal pipeline discharges are at least as important as dumping of sewage sludge and dredged material in polluting marine resources and causing damage to them.[2] Combined (storm and sanitary) sewer overflows also are important sources of pollutants in some marine areas. Runoff (nonpoint source pollution) from agricultural lands and urban areas -- although not classed as a disposal activity -- also contains large amounts of certain pollutants (such as suspended solids, fecal coliform bacteria, nutrients, pesticides, and some metals) and enters marine waters in large quantities. In some waterbodies, runoff is considered the leading cause of degradation.

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[2] Alternative, land-based disposal of most of these wastes is limited by economic feasibility, public opposition, and regulatory restrictions.

Concerns heightened in 1987, when several incidents focused public and government attention on the quality of U.S. marine waters. These include the infamous barge of trash that wandered to three countries before returning to New York; the deaths of hundreds of dolphins along the east coast; and the washing ashore in New Jersey of illegally dumped medical wastes during the height of the summer tourist season. The summers of 1988 and 1989 saw further wash-ups of medical wastes on the beaches of numerous States, as well as continued occurrence of the other adverse effects enumerated above.

Although the OTA report focused on land-based sources of marine pollution, such pollution is not the only way in which marine waters can be degraded. Another potential source of pollutants is acid deposition from the air; interest in this was sparked by a 1988 Environmental Defense Fund report, and several Senate bills would require EPA to study this source.

Moreover, we cannot forget that "non-polluting" activities also greatly affect marine waters. OTA and many others have noted that filling of wetlands, channeling or diversion of rivers, and overharvesting of fish and shellfish significantly affect marine waters and resources throughout the country. The first two of these are frequently related to the increased pace of development along our marine shorelines.

More than anything else, it is this development factor that makes the situation with estuaries and coastal waters so unique and precarious. About three-fourths of the U.S. population is expected to live within 50 miles of a coastline, including the Great Lakes, by the end of this century. As might be expected, this will mean increased development and redevelopment along shorelines. In turn, unless careful consideration is given to their ultimate environmental effects, development and redevelopment will entail both habitat modification in some cases and increased pollutant inputs into marine waters in almost all cases.

Among the activities that degrade our coastal waters, the issues of nonpoint pollution from agricultural areas and of coastal development patterns have received little Federal attention. Both are related to land-use planning, which traditionally has been a matter for local and State consideration. Many observers have identified land-use planning as a critical factor in determining the pace and extent of development and in controlling urban and agricultural nonpoint pollution.

U.S. COASTAL POLLUTION MANAGEMENT EFFORTS

Two statutes form the basis of most Federal regulatory efforts to combat marine pollution: the Marine Protection, Research, and Sanctuaries Act (MPRSA) and the Clean Water Act (CWA). The MPRSA regulates the dumping of waste material in coastal and open ocean waters, while the CWA has jurisdiction over pipeline discharges in all marine waters, dumping in estuaries, and (theoretically) runoff.

The MPRSA and CWA use pollution control strategies based both on marine quality standards and on emission standards. The pollutant control programs under the CWA and the dumping criteria and permitting procedures under the MPRSA have helped reduce the amounts of pollutants entering marine waters. Under the CWA, the construction or upgrading of municipal sewage treatment plants -- towards which the Federal government has contributed almost $50 billion during the past 15 years -- has led to some important successes, namely increased oxygen levels and decreased nutrient levels in some estuaries and coastal waters. The CWA also has succeeded in reducing the levels of some metals and organic chemicals in industrial discharges into marine waters. The MPRSA, despite the controversy over the dumping of municipal sewage sludge, has been effective in regulating dumping in coastal waters and the open ocean; in particular, the dumping of industrial wastes has declined dramatically since the early 1970s.

However, these provisions have not fully protected estuaries and coastal waters from degradation associated with waste disposal. OTA's analysis of this situation focused on the CWA, because it is the primary statute covering the most important sources of pollutants entering estuaries and coastal waters -- pipeline discharges and runoff. Only partial implementation of the relevant CWA provisions has been achieved to date.

Moreover, even with total compliance, existing regulations still will not be sufficient to maintain or improve the health of all estuaries and coastal waters for several reasons:

- current programs do not address all important toxic pollutants;
- current programs do not adequately address runoff;
- urban runoff and legal pipeline discharges will increase as population and industrial development expand in coastal areas; and
- Federal resources for sewage treatment are declining, and the ability of States and communities to fill the breach is uncertain.

The United States has been unable to develop a comprehensive pollution control strategy, one that simultaneously considers multiple environments, types and sources of pollutants, and exposure pathways. For example, the laudable reduction of "conventional" pollutants (e.g., suspended solids, fecal coliform bacteria) in municipal sewage effluent also resulted in the increased production of sewage sludge -- and we have not yet provided adequate long-term management for this voluminous, controversial byproduct.

There is consensus among public interest groups and local, State, and Federal officials that a more comprehensive strategy is needed -- in particular, one that considers the entire "system" that generates pollutants. One part of this strategy concerns avoiding the generation -- and hence the need to dispose -- of waste materials in the first place. This can involve, for example, on-site "source" reduction of hazardous and non-hazardous industrial wastes. Another part is to avoid using as much of some products that provide important benefits but which also contribute pollutants that eventually enter coastal waters. For example, using fewer pesticides and herbicides in lawn care and agricultural production can reduce the levels of pollutants in runoff. A third part is to recycle those waste materials that are generated. For example, sewage sludge can be applied on land to enhance soil productivity or reclaim degraded lands -- providing the sludge meets appropriate standards regarding concentrations of metals, bacteria, and other constituents.

Clearly, to the extent that this strategy can be implemented, then the amounts of pollutants in runoff and the need to intentionally dispose of various wastes in different environments can be reduced. However, little attention has been given to these efforts, both in general and more particularly with respect to coastal waters. There is a clear need for greater incentives -- be they regulatory or non-regulatory -- to reduce the generation of wastes as the best means of reducing waste disposal-related risks.

Unless such incentives are in place and until they have been shown to be effective, however, large amounts of municipal and industrial wastes and dredged material will continue to require disposal for the foreseeable future. These wastes will continue to contain metals and synthetic organic chemicals, limiting possibilities for their beneficial re-use.

In this regard, the effluent fee provision in H.R. 2647 is an innovative approach that could be very helpful. While such a system would be difficult to implement, it could help internalize some of the costs of marine disposal and presumably provide an incentive for eliminating such disposal, or at least for eliminating the substances that cause problems during disposal (e.g., heavy metals, organic chemicals). While it has limits in that it does not address urban and agricultural runoff, it could go a long ways in providing the economic incentives needed to encourage direct dischargers to reduce the volume and toxicity of their discharges.[3]

PROTECTING COASTAL WATERS

Various strategies might help to maintain or improve the health of our estuaries and coastal waters. **To begin, the current system could be improved by increasing enforcement, and by amending the Clean Water Act to expand controls over a broader range of sources and to promote reduced generation of wastes.**

H.R. 2647 contains many provisions that will help in adopting this strategy, for example:

- applying existing ocean discharge criteria to all coastal water discharges;
- requiring EPA to develop coastal water quality criteria and States to adopt standards based on those criteria;
- extending the scope of these criteria from their traditional focus on water quality to other measures of environmental health, such as sediment quality; and
- establishing an effluent fee system, which should encourage reduced generation of waste (see above) and strengthen the industrial pretreatment program.

This strategy will help bolster our existing regulatory tools, and it will likely be sufficient to prevent or correct problems in some marine waters.[4] But it will require some combination of continued Federal, State, and local investments in enforcement efforts for all regulations, as well as industry investments in changing processes and technologies to comply with these regulations. The development of additional coastal water quality criteria will be difficult, but it would provide an important tool in future permit evaluations.

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[3] A fee on runoff might be imposed by taxing the products that contribute pollutants to urban and agricultural runoff.

[4] S. 1178 and 1179 contain other provisions that would help improve the Clean Water Act, including regulating combined sewer overflows and stormwater discharges into marine waters; requiring an inventory of releases of toxic substances and a strategy to combat subsequent problems; and linking permit renewals for discharges with a determination that available waste minimization practices are being fully applied.

Such a strategy also will require monitoring and research, for purposes of enforcement and evaluating long-term trends. H.R. 2647 would set up a national task force to **systematically** develop national monitoring guidelines, coordinate existing Federal monitoring activities, and establish regional monitoring programs. The bill would promote uniformity among monitoring programs, which is critical for comparing results, but it also recognizes that flexibility in monitoring is needed to address local needs. These provisions are similar in concept, albeit not in detail, to the regional marine research programs proposed under S. 587. In general, the regional approach -- if properly coordinated with ongoing efforts conducted by NOAA, EPA, and other Federal and State agencies -- could provide flexibility that standardized national monitoring and research programs cannot conduct.[5]

The strategy of strengthening existing Clean Water Act provisions will not be sufficient to protect many areas because of the adverse effects of runoff, increasing development, and other problems. A more comprehensive approach is needed. Many areas will require additional forms of management that use a broader, ecosystem-oriented planning approach -- i.e., on a watershed, drainage basin, or waterbody basis.

The Federal government and some States have already recognized this need and developed what OTA called "waterbody management" programs to attack site-specific problems that cannot be handled by existing CWA programs. The Chesapeake Bay Program and the Puget Sound Water Quality Authority are two well-known regional waterbody programs. They attempt to bring together all parties with vested interests (including ones with authority to address land-use and runoff issues), identify the most important problems and their causes, and devise a long-term management plan to alleviate those problems. In essence, they use planning on an ecosystem basis to establish site-specific goals and identify the most environmentally and economically effective means of achieving those goals.

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[5] S. 587 and other Senate bills contain provisions specifically regarding research on, for example atmospheric deposition, algal blooms, monitoring of floatables, monitoring protocols, and health and economic impacts. Some also would require the use of whole effluent biological toxicity testing as an indicator of pollution problems.

This site-specific approach is still in its infancy. The first Federal legislation authorizing it is the Water Quality Act of 1987, which authorized several activities and programs, including the National Estuary Program. Under the National Estuary Program, EPA is authorized to convene management conferences for individual estuaries. Several commercially important but degraded waterbodies have been included in the program through various pronouncements and activities by Congress, the States, and EPA. However, the process of selecting waterbodies has not involved a systematic, scientific identification of those waterbodies that need such management now or those that are likely to become degraded in the future.

The absence of a **system** for deciding when and how to provide additional, site-specific management raises important questions about the relative roles of Federal, State, and even local governments. Will enough waterbody management programs be developed and implemented? Should a national effort to select waterbodies and spur development of plans be developed? Will existing State and Federal mechanisms be used effectively to provide such management? An expanded system of any type would have to be flexible enough to integrate existing pollution control programs into new management plans. It might be most effective if it focused on identifying "needy" waterbodies and stimulating (e.g., with technical and financial assistance) the development and implementation of basin-wide management plans (i.e., vigorously implementing relevant provisions of the 1987 Water Quality Act). Some procedure is needed to account for ongoing, effective State and Federal efforts.

H.R. 2647 addresses many of these questions. It emphasizes basin-wide approaches to coastal resource and land use management and it attempts to make our efforts much more systematic. For example, it would:

- require States to develop comprehensive coastal water quality protection programs, to be submitted to EPA for approval;
- require the States, as part of the programs, to identify coastal waters now experiencing degradation or likely to suffer degradation in the future;
- provide for an enforceable system of tradable credits for point and nonpoint source pollution, with the intent of reducing overall pollutant loadings; and
- extend the authorities of the National Estuary Program, for example by requiring management conferences to be convened and requiring approval and implementation of conservation and management plans.

With respect to nonpoint pollution, the Water Quality Act of 1987 authorized EPA to administer a nonpoint pollution program. In the program, States are to identify waters not expected to meet water quality standards because of such pollution and submit a management program to EPA. However, Congress has not yet appropriated sufficient resources for this program. Some States have developed nonpoint pollution programs, but in general there has not been a serious look at the problem with respect to marine waters.

This bill takes a big step down this path by linking the Coastal Zone Management Act and coastal water quality. As noted above, coastal development is increasing rapidly and is a major factor contributing to the degradation of some marine waters. Although land-use planning has traditionally been a local and State matter, H.R. 2647 would:

- include coastal water quality within the policy goals of the CZMA; and
- require State coastal management agencies to develop an approved program to implement management measures (e.g., density restrictions, buffer strips) for land-based sources of nonpoint source pollution.

These programs involve other State and local authorities, and they would be developed in conjunction with existing water quality programs of the Clean Water Act, including the National Estuary Program.[6] Given the revised policy goals, they would begin to address a critical issue in coastal water quality, i.e., coastal development and associated land-use planning. Whether this would extend to filling of wetlands and channeling or diversion of rivers is unclear.

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[6] Senate legislation would address this with provisions to: 1) identify croplands that, if enrolled in the Conservation Reserve Program, would reduce nonpoint pollution; 2) establish a voluntary registry of coastal lands, owners of which would receive information about practices to help protect marine waters; 3) require the regulation of stormwater discharges; and 4) establish the eligibility of nonpoint pollution programs for grant assistance.

CONCLUDING REMARKS

In conclusion, I want to stress that success in protecting coastal waters will depend on involving local and State governments, the Federal government, the public, and the private sector for years to come. Obviously, this will require more cooperative efforts among these groups. Success will also require much more emphasis on source reduction and on difficult decisions about land-use issues (including runoff) and coastal development practices.

It is important to recognize that these efforts must be sustained for a long time. Success will not be achieved overnight. Without such efforts, the alternative is that our children will inherit coastal waters that are considerably more degraded than they are now.

SUBMISSIONS FOR THE RECORD

NRDC's Poison Runoff Index for Baltimore

Estimates of Selected Pollutants in Urban Stormwater Runoff Compared to Point Source Loadings

by Diane Cameron
Environmental Engineer

November 1989

NRDC's POISON RUNOFF INDEX

SUMMARY

What is Poison Runoff? Virtually every time it rains in developed areas, a wide range of chemicals; dirt, dust, and animal droppings; decaying leaves and litter; and other loose particles on streets and rooftops are washed into the nearest creek or river. Thus, a "cleansing rain" can actually create poison runoff. It can carry bacteria and viruses; poisons like zinc, copper and pesticides that contaminate drinking water and seafood; excessive nutrients like phosphorus that promote algae growth and rob fish of oxygen; and sediment that can smother fish eggs and submerged plants.

Why do we need a Poison Runoff Index? While the poison runoff problem has been known for some time, few efforts have been made to quantify the problem. The Poison Runoff Index is a measure of the quantities of toxins in urban runoff. The Index incorporates information on local land use patterns, total rainfall, and levels of toxic chemicals and harmful nutrients measured in previous runoff studies to estimate how many pounds of a given pollutant are being deposited in local waters.

What does the Index tell us? NRDC's Poison Runoff Index for Baltimore shows that poison runoff rivals factories as a source of Chesapeake Bay pollution. From January through October, 1989, NRDC estimates that 90,500 pounds of zinc, 17,200 pounds of copper and 5,800 pounds of lead were carried into Baltimore's streams and rivers by poison runoff. This was six times the amount of zinc, and almost as much copper and lead as was discharged by Baltimore manufacturers into Baltimore Harbor in 1988. NRDC also estimates that four times as much biological oxygen demand, over 50% of the total phosphorus, and almost one-fourth the amount of nitrogen was contained in Baltimore City's runoff in the first ten months of 1989, as was discharged by factories in 1988 into Baltimore Harbor.

What can be done about poison runoff? Both personal and political action is required to tackle poison runoff. Homeowners can re-landscape their lawns to include more trees and to require less fertilizer. They can also install perforated drain spouts and divert rainwater from the roof to the lawn, instead of into a stormdrain. Citizens can demand that developers leave more trees standing when new subdivisions are built, that buffer strips be left between buildings and next to creeks, and that communities install basins to treat runoff before it reaches area waters. NRDC's 1989 book, **Poison Runoff**, contains many other examples of steps to control this insidious form of pollution.

NRDC's Poison Runoff Index for Baltimore

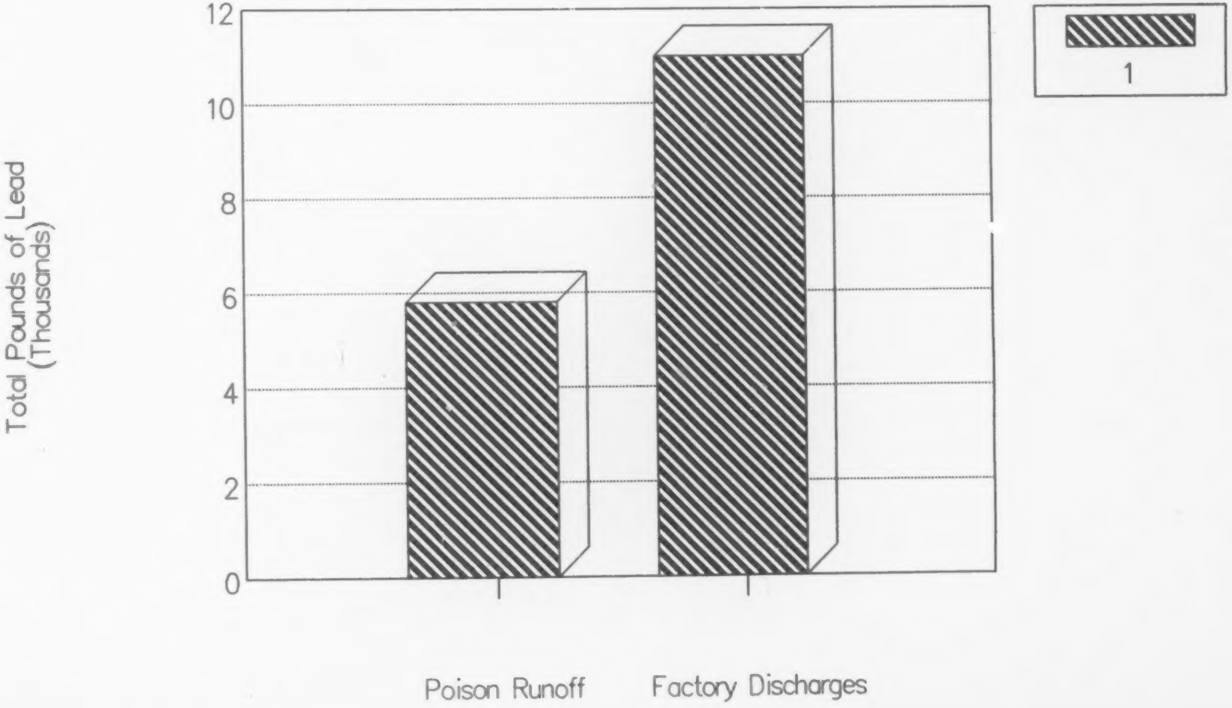
Pollutant	Total Loadings (pounds) Jan. 1-Oct. 31, 1989	Industrial Discharges to Baltimore Harbor 1988 (pounds)*
Lead	5,800	11,000
Zinc	90,500	14,600
Copper	17,200	18,200
BOD	3,252,800	730,000
Phosphorus	172,600	255,500
Nitrogen	1,322,900	6,387,500

(BOD = Biological Oxygen Demand)

*Source of data: Maryland Department of the Environment (1988)
For More Information, Contact: Diane Cameron (202) 624-9347.

Poison Runoff Versus Factory Discharges

From the City of Baltimore



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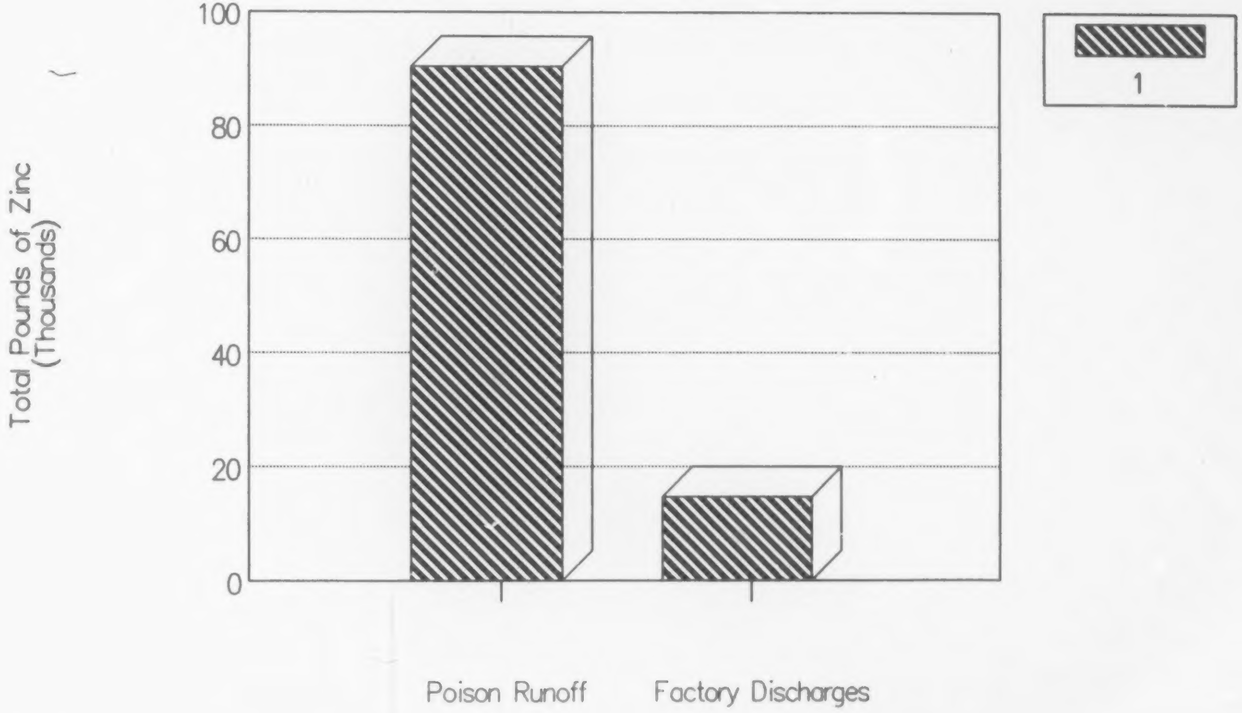

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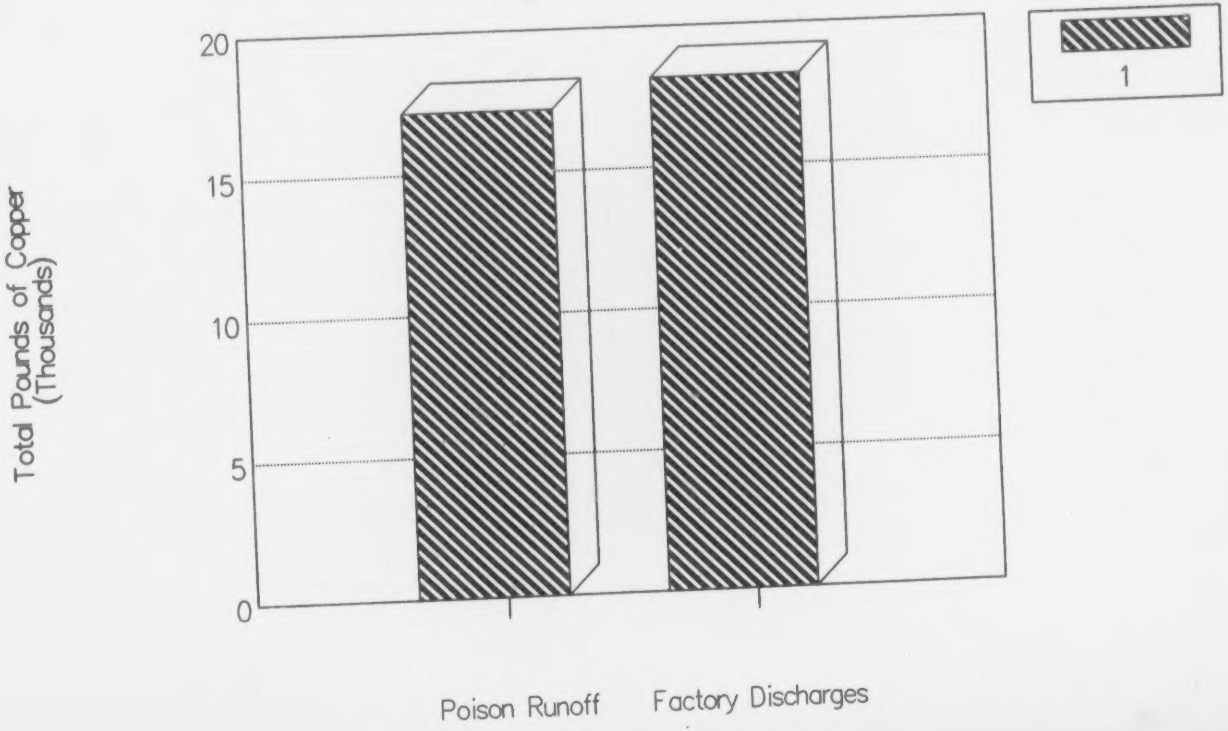

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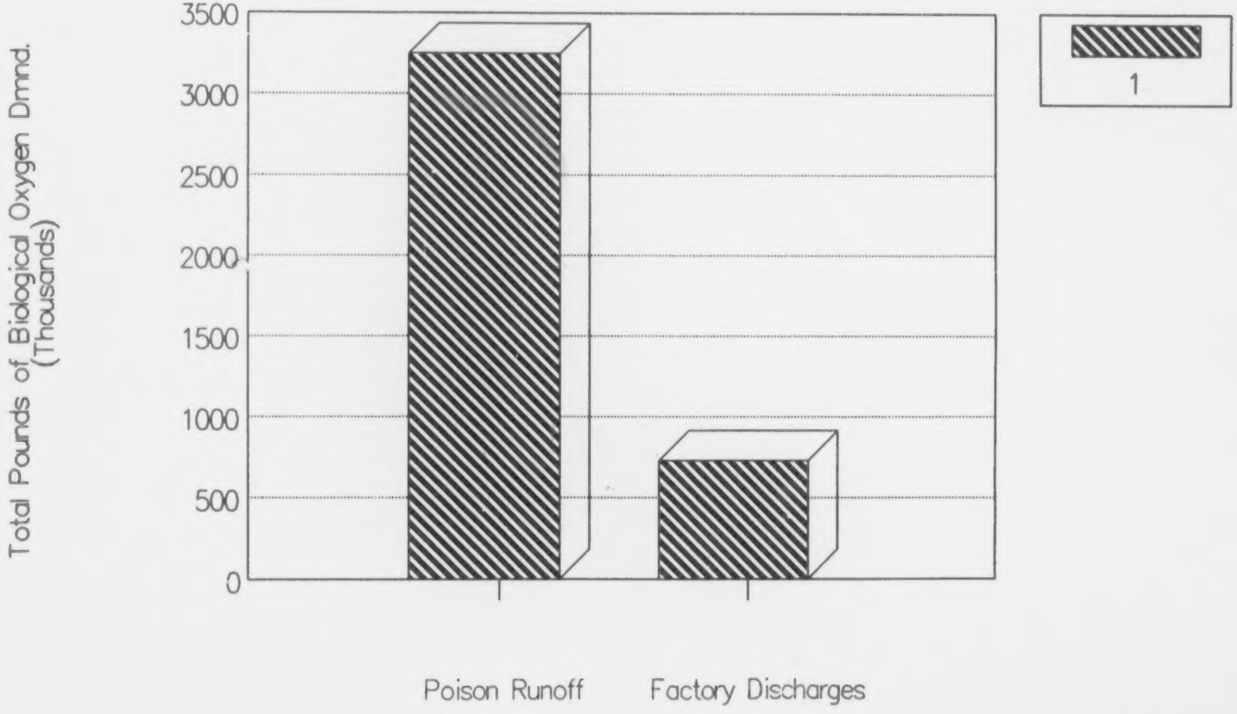

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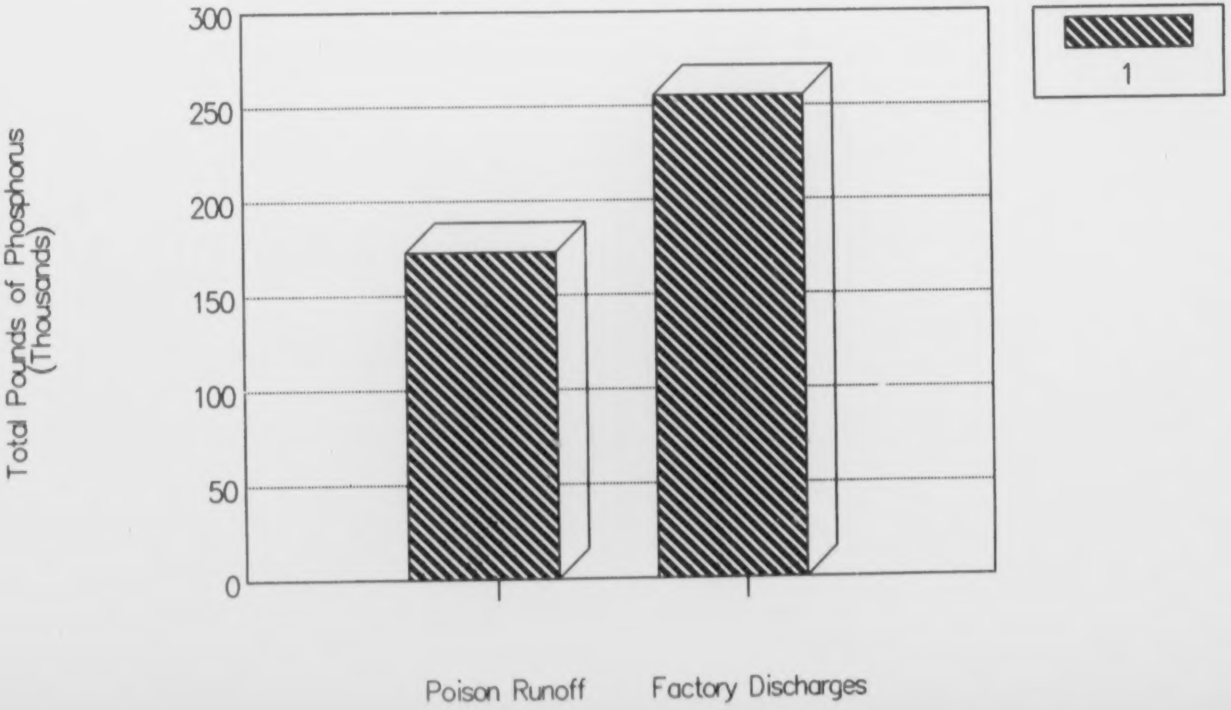

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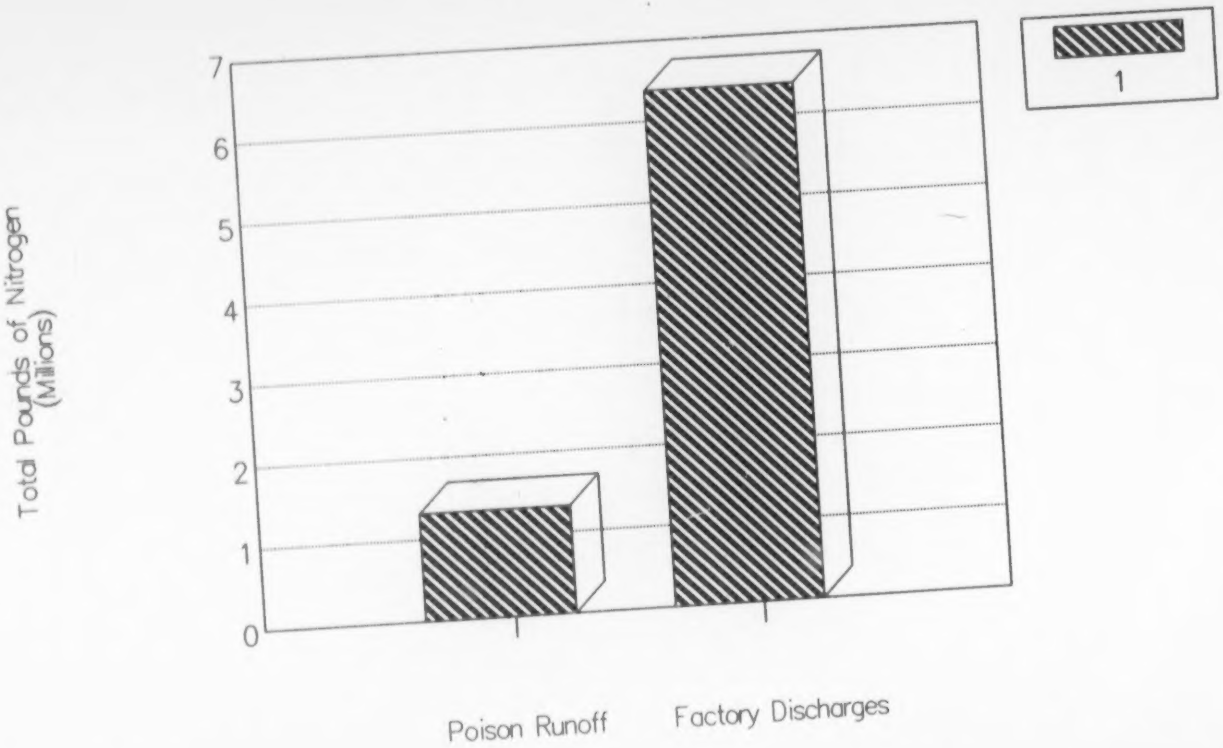

Explanation of NRDC's Poison Runoff Index

WHY ARE WE INTERESTED IN POISON RUNOFF?

"Pollution flows from the end of a pipe." At least that is the common wisdom, reflected in federal water pollution control budgets and state and federal enforcement programs. But in this case, the common wisdom is wrong; at least one-half of all polluted rivers, lakes and coastal waters are contaminated by sediment, toxic metals, pesticides and other chemicals that do not flow from the end of a pipe. These pollutants "run off" city pavement and rural farmland when it rains and when snowdrifts melt.[1]

Because this poison runoff is diffuse and difficult to visualize, and often politically and administratively difficult to prevent, it has been largely neglected by state and federal pollution control programs. Yet figures recently released by EPA show that out of over 17,000 heavily polluted surface waters around the country, only 595 (less than 5%) are polluted largely or entirely by factory and sewage discharges. The rest of the waters are polluted, at least in large part, by poison runoff.

According to estimates by NRDC, poison runoff levels of some individual pollutants rival the output of factories and large municipal sewage treatment plants. When these pollutants get into rivers, streams, and the Chesapeake Bay, they wreak havoc on fish and shellfish and other aquatic life. Nutrients promote excess algae and bacteria growth that blocks light and robs fish of necessary oxygen, often causing large fish kills. Heavy metals, pesticides and other toxic pollutants harm fish and shellfish reproduction, may cause cancerous lesions, and build up to levels that make the fish and shellfish unsafe for human consumption. Heavy metals, for example, pose risks of kidney and central nervous system damage. Even sediment, the largest runoff pollutant by volume, poisons aquatic systems by smothering fish eggs and aquatic plants.

WHAT DOES THE POISON RUNOFF INDEX SHOW?

Taking Baltimore City as an example, NRDC performed a series of calculations to estimate the quantities of six key pollutants that run off of highways and commercial, residential, and industrial areas into area surface waters. The estimates are presented as an "index" of the amount of poisons present in urban runoff in a given time period. While conservative, the estimates show that poison runoff from urban areas is a significant problem which deserves more attention from environmental policymakers, local and state administrators, public works managers and the public.

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[1] These pollutant estimates do not include direct air deposition of pollutants to the Chesapeake Bay. For some pollutants (i.e. zinc) direct air deposition accounts for a significant proportion of total Bay loadings.

The Index shows estimates of uncontrolled loadings of three heavy metals (lead, zinc, and copper), two nutrients (nitrogen and phosphorus), and Biological Oxygen Demand to the surface waters of Baltimore City.

HOW ARE THE POLLUTANT ESTIMATES CALCULATED?

Pollutant loadings are a measure of total mass of pollutant, in pounds, carried by runoff to surface waters over a given time period. The Index calculated pollutant loadings to surface waters for January 1 through October 31, 1989. The Index is calculated by multiplying the amount of runoff over a particular time period by the concentration of pollutant in the runoff and the land area of the particular urban region. Land use data obtained for Baltimore City broke the city down into a number of land use categories such as high-density residential, commercial, industrial, and so on. Separate pollutant loadings were estimated for each of the individual land use categories. Appendix A explains in greater detail the method used in calculating the Poison Runoff Index.

These estimates do **not** include runoff from Baltimore's growing suburban areas; they cover only the runoff from within the Baltimore City limits.

HOW CAN WE INTERPRET THESE POISON RUNOFF ESTIMATES?

The magnitude of these loadings estimates can be illustrated with a few comparisons.

Zinc loadings in 1989 to Baltimore City waters were estimated to be six times the total zinc discharged by industries to Baltimore Harbor in 1988. The amount of copper estimated to be delivered to Baltimore City waters by urban runoff for Jan-Oct 1989, 17,200 pounds, is almost equal to the total of 18,200 pounds of copper discharged by factories to Baltimore Harbor in 1988, as estimated by the Maryland Department of the Environment.

The amount of lead delivered to Baltimore City waters by stormwater runoff in the first ten months of 1989, 5800 pounds, was more than half the total factory discharge of lead to

Baltimore Harbor in 1988 (11,000 pounds), as estimated by the Maryland Department of the Environment.[2]

The urban runoff loadings of Biological Oxygen Demand (BOD), (organic matter that robs fish and other aquatic life of needed oxygen) estimated for Jan-Oct 1989 for Baltimore City, 3.25 million pounds, is quadruple the estimated factory BOD loading to Baltimore Harbor in 1988 (730,000 pounds). The amount of phosphorus in the poison runoff for Jan-Oct 89, 172,600 pounds, was over one-half the estimated 1988 factory loading of phosphorus to the Harbor (roughly 255,500 pounds). Poison runoff contributed an estimated 1.3 million pounds of nitrogen to Baltimore City waters during the first ten months of 1989, which was over one-fifth the amount of nitrogen estimated to be contributed by factories to Baltimore Harbor in 1988 (6,387,500 pounds).

WHAT IS CURRENTLY BEING DONE TO CONTROL STORMWATER RUNOFF?

The pollutant estimates given above are based on an assumption that concentrations of nutrients and metals to surface waters throughout Baltimore are the same as when the NURP measurements were taken. In other words, we have assumed that no new pollutant reductions have been achieved by stormwater control devices such as detention basins since the concentration values were measured in the early 1980s. The City of Baltimore, and the citizens' group Save Our Streams, have undertaken pilot poison runoff control programs in Baltimore City. The Gwynns Fall Restoration Campaign spearheaded by SOS has made great strides in heightening public awareness and in implementing monitoring and control programs along specific streams. Numeric estimates are not yet available on the pollutant reductions currently being achieved by this campaign. This, and other poison runoff control programs deserve greater support, both financial and political. We hope that greater public awareness of the severity of the poison runoff problem, spurred on by publication of these runoff estimates, will engender such support.

NRDC published earlier this year a 484-page book entitled **Poison Runoff: A Guide to State and Local Control of Nonpoint Source Water Pollution.** This book contains a chapter on urban runoff with recommendations for changes in State and local land use and stormwater management policies. Among the key recommendations made by NRDC are that land use controls should be used to acheive compliance with water quality standards, for example, by encouraging more green space in new developments, and by requiring buffer zones between buildings and water bodies. Another key recommendation advocates the use of detention basins and other controls to treat polluted runoff before it reaches water bodies.

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[2] NRDC estimated that use of leaded gasoline declined by 95% between 1979 and 1989, and thus conservatively reduced the concentration values of lead used in the poison runoff calculations by 95% over the EPA values, which included values recorded in the late 1970s and early 1980s.

WHAT ARE THE SOURCES AND THE EFFECTS OF POISON RUNOFF?

The following Table lists the three heavy metals and three nutrients highlighted in the Poison Runoff Index, and briefly describes their sources and effects.

Sources and Effects of Selected Toxic Metals and Nutrients Found in Urban Runoff

Pollutant	Sources	Effects
Lead	automobile exhaust; exterior paints	bioaccumulates in bottom-dwelling fish and shellfish; spinal deformities; retarded growth; reduced photosynthesis; toxic to fish.
Zinc	weathering and abrasion of galvanized iron and steel; atmospheric fallout	bioaccumulates; toxic to fish.
Copper	leaching and abrasion of copper pipes and brass fittings; auto brake linings	bioaccumulates; toxic to fish
BOD	vegetation; litter and garbage; animal droppings	robs fish of needed oxygen
Total P	same as for BOD; lawn fertilizer	causes algal blooms which block light and reduce oxygen
Total N	same as for BOD; lawn fertilizer	causes algal blooms which block light and reduce oxygen

Based on Schueler, 1987, A Framework for Evaluating Compliance With the 10% Rule in the Chesapeake Bay Critical Area.

Appendix A

Description of the Method Used

The Poison Runoff Index is based on the "Simple Method" for estimating water pollution loadings developed by the Metropolitan Washington Council of Governments in its 1987 book "Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs," authored by Thomas Schueler.

The Simple Method is a straightforward way of estimating pollutant runoff loadings from developed urban areas. The Method consists of a simple equation where total rainfall, site imperviousness, pollutant concentration, and site acreage all are factored in:

$$L = [(P)\ (Pj)\ (Rv)/12]\ (c)\ (A)\ (2.72)$$

where L = pollutant loading in pounds over a given time interval
P = rainfall depth over the given time interval
Pj = a factor that corrects P for storms that produce no runoff (assume .9 for seasonal and annual calculations)
Rv = runoff coefficient which describes the amount of rainwater converted to runoff. (This figure is based on an estimate of impervious surface (surface resistant to infiltration) in the area of concern - it can be easily calculated based on knowledge of land uses in a given jurisdiction.)
C = average concentration of the pollutant in urban runoff in milligrams/liter.
A = area in acres

2.72 is a unit conversion factor.

The loading can be calculated for each land use category (i.e., for each land use, an estimate of imperviousness, pollutant concentration, and area is made) and then aggregated; or an overall average for imperviousness and pollutant concentration can be made and applied to the entire area under consideration. For Baltimore City we have used the former method.

Further Assumptions in Applying the Simple Method

- Total land use areas, on a category-by-category basis,(categories included high-density residential, industrial, etc.) ranged from 92 acres to over 15,000 acres in the calculations made by NRDC. This land use information was derived from a 1985 satellite photo interpretation that used a grid pattern to estimate total acreages of various land use categories for Baltimore City. While the data is over four years old, the basic land use categories are not presumed to have changed significantly in Baltimore City during this time period. The estimates for the larger land areas are of course less exact than for the smaller areas; however, they are still useful in estimating pollutant loadings, and in any case, they err on the side of underestimating the loadings.

* The concentration values are taken from the Nationwide Urban Runoff Program (NURP) study, a large study organized by EPA between 1979 and 1983. Some of the land use categories are assigned national NURP average concentration values; the "roads" category is assigned concentration values from the National NURP highway runoff averages; "high-density" and "medium density" residential categories are assigned the "Older Urban Areas" concentration values derived from the Baltimore NURP study. The "commercial" category was assigned concentration levels based on the averages from the NURP Central Business District (CBD) site data for the Washington D.C. region. For total phosphorus and copper estimates, no CBD values were available from the NURP study; therefore we substituted the National NURP averages for the downtown/ industrial land use categories for the phosphorus and copper loadings estimates. The net effect of these assumptions is to underestimate total pollutant loadings. The estimates are conservative because we generally use the more conservative national average values taken from the average of all 28 cities participating in the NURP study.

* Pollutant concentrations (mass per unit volume) in runoff may vary from storm to storm and from site to site. However, mean annual pollutant concentrations, developed from multiple samplings at each site and then averaged over many sites, do not vary in a statistically significant way. Pollutant loadings (total mass of pollutant delivered to surface waters) increase as total rainfall increases.

Summary of Concentration Values Used in Estimating Pollutant Loadings in Baltimore's Stormwater Runoff

Pollutant	National NURP Study Average	Central Business District (Wash.,DC)	Older Urban Areas (Balt.)	National Urban Highway Runoff
Lead	0.18/0.001*	0.37/0.018*	0.39/ 0.019*	0.55/ 0.027*
Zinc	0.176	0.25	0.397	0.38
Copper	0.047	-----	0.105	-----
BOD	11.9	36.0	-----	-----
Total P	0.46	-----	1.08	0.59**
Total N	3.31	2.17	13.6	-----

Based on Schueler (1987) "Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs" Table 1.1, pg. 1.13.

* As explained above in the footnote on page 4, the values for lead were reduced by 95% in these calculations, to account for assumed reductions in the use of leaded gasoline.

** No Total phosphorus concentration value was available for the National Highways category; only "soluble phosphorus" concentration values were available and this value was used instead.

EBB TIDE FOR POLLUTION:
Actions for cleaning up coastal waters

Natural Resources Defense Council

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Dwight Holing

FOREWORD

For me, and for most of us, no place on Earth holds more fascination than where land meets sea. Coast, beach, shore, and tidepool—no matter what we call it, our coastline is a source of beauty and wonder: palmettos rustling along the South Carolina shore, whooping cranes basking in the warmth of Gulf Stream waters, surf splashing on the beach at Malibu, and the lights of Manhattan reflected in a river bound for the sea. No wonder most of us strive to live close to these waters. They sustain us, spiritually as well as physically. The sea is life's genesis, and in some deeply instinctive way we flock to our primordial birthplace.

Ironically, our dependence on the coast is killing it. From Alaska's once unblemished Prince William Sound to Santa Monica Bay, from the retreating wetlands of Louisiana to sewage-choked Boston Harbor, the coast is floundering in an abused sea. Oil has invaded the home of sea mammals and sea birds. Medical wastes litter our beaches. Raw sewage swirls over oyster beds and through waters once teeming with fish. Industrial poisons pour into our coastal zones. And in many areas, marshes are being destroyed through diking and draining to make way for buildings and roads.

Many coastal systems can barely function as a result. Filled wetlands no longer filter and clean runoff from the land, and are no longer the home to a variety of marine species; eroded shorelines cannot buffer the onslaught of storms. As pollution becomes chronic and degradation long-term, the coast loses its ability to protect and provide. Habitat is lost. Species vanish. The entire food chain is affected; humans are not exempt.

While the situation is dire, it is not hopeless. There are solutions, sensible strategies that will clean up pollution and reverse the decline of our coasts. The Natural Resources Defense Council has a solid record of research and advocacy on behalf of the environment, and has compiled and offered a range of solutions.

The recommendations here are important and practical. The plan is directed to each and everyone of us in steps that we all can take as individuals and as a society. These are as simple as washing with phosphate-free detergent at home, using less water, and supporting strong land use planning in your community. I urge you to become involved and to act.

We have inherited a magnificent coast, yet our ability to pass this heritage to future generations depends on our willingness to reform the practices of the past. We cannot repair the damage caused by pollution and unwise development overnight. But with persistence, we can return our coastal zones to their natural vitality and beauty. Together we can turn the tide.

—Jean-Michel Cousteau
The Cousteau Society

INTRODUCTION

Town of Ocean City, MD

Like most of the great civilizations throughout history, the United States owes much to its proximity to the sea. In the early days, coastal areas provided the settlers with an hospitable environment: bays and estuaries, which supplied us with a rich bounty of food, and natural harbors, which allowed American cities to become among the richest in the world. The coast continues to attract. Today, over half the population lives within 50 miles of coastal waters, including those of the Great Lakes.

By building our largest cities along our coasts and continuing to crowd into environmentally sensitive coastal areas, we have placed an immense burden on the very ecosystem on which we depend for so much. Each year our factories dump no less than five trillion gallons of wastewater into coastal waters. We flush another 2.3 trillion gallons of sewage into them as well. And every time it rains or snows, massive amounts of poisonous substances, including gasoline and pesticides, are carried into the sea as runoff from our city streets and farms.

When we dump our wastes into coastal waters we pose a serious threat to the environment, the food chain, and our own health. By eating contaminated shellfish, for instance, we run the risk of contracting a variety of diseases, including typhoid and viral gastroenteritis. Worse, many of the substances absorbed by shellfish can cause cancer, birth defects, or other illnesses. Swimming in coastal waters contaminated by sewage is also unhealthy. The infectious agents in sewage have been linked to such illnesses as hepatitis.

Few regions in the country have escaped the effects of coastal pollution. In 1985, nearly one-third of the productive shellfish areas in the U.S. were limited due to actual or potential contamination by sewage or other pollution. Three sites within Puget Sound in Washington have been declared Superfund sites due to the amount of heavy metals found in the sediment. New York has prohibited the commercial sale of striped bass caught in state waters after the level of PCBs contained in the fish surpassed FDA allowable limits. Beaches along the East Coast have been closed because of a tide of used syringes and other medical waste. And swimming in California's Santa Monica Bay has been declared unsafe because of extensive and chronic untreated sewage dumping.

While there is little doubt that the problem of coastal pollution is systemic, there are a few bright spots on the horizon. By strictly controlling factory discharges into Naugatuck River, for example, Connecticut has been able to reduce the level of toxic pollutants to the point where trout are now being stocked in the river's upper reaches. In Arcata, California, an artificial wetland has been built on the site of an abandoned dump and is being used to treat sewage as an alternative to pumping it into a nearby bay. The facility not only provides additional natural filtration and cleansing, but doubles as a wildlife sanctuary.

As these examples show, the problem of coastal pollution can be solved. However, much remains to be done. The Natural Resources Defense Council (NRDC) is meeting the challenge head on. For over 15 years, NRDC has been a leader in the fight to protect our country's waters, natural resources, and public health and safety. NRDC efforts helped to strengthen federal environmental laws, such as the Clean Water Act, the Ocean Dumping Ban Act, and the Coastal Zone Management Act. NRDC lawsuits ensured that those laws were implemented and enforced aggressively. Additionally, NRDC scientists developed new approaches to control society's wastes and to protect America's coastlines.

NRDC realizes there is a need for a unified program to save America's coasts. Such a plan of action must identify the severity and extent of the problem, the sources of coastal pollution, solutions that have worked in the past, and new steps that must be taken to stop the decline of our coasts. This report presents NRDC's plan to reverse coastal pollution. The report discusses:

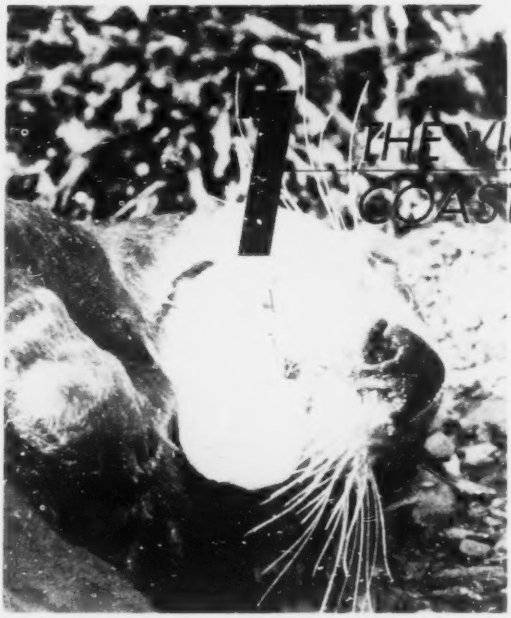
- The importance of coastal resources.
- Threats to our coastlines — causes, severity, and extent.
- Ways to stop coastal pollution — past successes and new solutions.
- A plan of action to save our coasts.

The health of our coastal waters is crucial to our quality of life. Summer would not be summer without days at the beach. The annual migration to sun, surf, and sand supports a multibillion dollar coastal tourism industry. Coastal waters also are the basis of a multibillion dollar commercial fishing industry. The total U.S. commercial fish and shellfish catch from all marine waters was $2.3 billion in 1985 at the dock; half of this catch came from within three miles of shore. This translates into a lot of seafood dinners.

Healthy coastal waters are important from an ecological standpoint as well. Coastal wetlands provide three important benefits. They act as sponges, soaking up floodwaters and keeping them from reaching higher ground. Wetlands also serve as the nation's kidneys, filtering some types of pollutants through the actions of bog plants, sediment, and microorganisms. In addition, they provide a nursery for fish and wildlife.

Beaches, coastal marshes, and estuaries are all part of our national heritage. Their value goes far beyond economics. The lobster buoys of Maine and the harbor boats of New Orleans are symbols of the diverse benefits that we derive from coastal waters. But we must maintain healthy coastal waters for more than just ourselves — we must ensure that future generations will be able to go beachcombing on Cape Hatteras or shrimp fishing off Louisiana. By implementing NRDC's program now, we can protect all these things we love about the coast. If we don't, we will lose them forever.

THE VICTIMS OF COASTAL POLLUTION



Richard Newman

The outward symptoms of the flood of toxic pollution, poison runoff, and sewage contamination inundating our nation's coastal waters are polluted beaches, dying fish populations, and contaminated seafood. Few parts of the country have escaped the fallout. Marine life isn't the only victim of coastal pollution. We all are — as consumers, tourists, and workers.

Contaminated Seafood

Coastal areas are among our richest fishing grounds. More than 70 percent of commercially important species of fish and shellfish depend on coastal areas as habitats. Many of the toxic contaminants pouring into our waterways are coming back to our dinner tables in seafood. Many coastal and estuarine areas are so contaminated that fish and shellfish cannot be harvested there since consumption would pose a serious health risk. Even areas considered pristine are vulnerable. Sediments in Casco Bay, Maine, for instance, are contaminated with heavy metals, PCBs, polycyclic aromatic hydrocarbons (PAHs), and pesticides at levels as high as some of the heavily polluted New England harbors further south. These pollutants are absorbed by winter flounder and mussels there.

Chemicals and Heavy Metals. Toxic chemicals and heavy metals dumped into coastal waters contaminate marine sediments and also concentrate in fish and shellfish.

Shellfish, including oysters, mussels, and clams, are especially vulnerable to contamination from toxic metals such as lead, mercury, cadmium, and chromium. These metals can cause a range of adverse health effects in humans, including kidney and central nervous system damage and birth defects in unborn fetuses.

Methyl mercury, a highly toxic form of mercury, has been found in large predatory fish such as swordfish and tuna. In March 1989, the Florida Department of Health advised consumers to avoid largemouth bass and warmouth fish from the Everglades after these gamefish were found to have the highest levels of methyl mercury ever recorded in the U.S.

***Coastal Waters** — All waters at or near the coasts, including bays, estuaries, the Great Lakes, and sounds.*

***Superfund** — A law passed by the U.S. Congress to respond to uncontrolled releases of hazardous waste at abandoned dumpsites and other facilities.*

Many cancer-causing industrial chemicals such as PAHs, petroleum hydrocarbons, dioxins, and PCBs have also been found in seafood. PCBs, which accumulate and concentrate to high levels in fatty tissues of fish, have frequently been found in older and larger predatory species such as bluefish, striped bass, coho salmon, and lake trout. Since the early 1970s, residents of the Great Lakes region have been cautioned to restrict their consumption of locally-caught lake trout, salmon, and other fish because of high levels of PCBs. Nursing mothers, pregnant women, women who expect to bear children, and children below the age of 15 are advised to completely avoid a wide range of fish caught in the Great Lakes because of the detrimental effects of PCBs and other chemical contaminants. Commercial sale of striped bass caught in all New York waters has been banned because of high levels of PCBs, as well. Consumers have also been advised on occasion to avoid eating bluefish caught along the East Coast because of PCBs.

Dioxins, one of the most toxic classes of substances known, have also been found in fish in a number of coastal areas. Dioxins can cause cancer and birth defects in humans. In late 1988, high levels of dioxins were found in carp, perch, and rainbow trout caught in some areas of the San Joaquin and Sacramento rivers in California. The dioxins were traced to industrial discharges from upstream paper mills. A more recent comprehensive EPA survey found dioxin-contaminated fish downstream of paper-mills all over the country, including many areas of important coastal fisheries. The highest levels were found in the Sampit River estuary in South Carolina.

Entire fishing areas have been contaminated. In 1988, EPA released a major study of Quincy Bay, a major commercial and recreational fishing ground in Massachusetts. As a result of chronic dumping of toxic substances from sewage treatment plant outfalls and industrial discharges, lobsters, flounder, and clams in the Bay are contaminated with PAHs, PCBs, and toxic metals. The most serious contamination found was the high levels of PAHs in lobsters. EPA determined that at the levels detected, these contaminants pose a significant risk of cancer and other health effects for people who frequently eat fish and shellfish from the Bay. Seafood lovers there have been advised to reduce their consumption of locally-caught seafood, and pregnant women to avoid it completely. This health advisory is still in effect today.

Agricultural pesticides such as DDT, dieldrin, and chlordane that have leached from or run off the land also contaminate fish. In 1987, FDA found some pesticide residues in 73 percent of the seafood samples tested from U.S. fishing waters. In fact, between 1979 and 1986, 5.2 percent of the seafood samples tested by the FDA had high levels of pesticide residues above the legal limits. This violation rate for pesticides in seafood is higher than for any other food group, including fruits, vegetables, and dairy products. These pesticide residues pose serious long-term health risks for consumers. For example, the levels of DDT and dieldrin residues found in fish from the Great Lakes are very high and pose a significant cancer risk for people who regularly consume locally-caught fish.

DDT contamination of sediments and fish in Santa Monica Bay and off the coast of Southern California is a good example of how persistent chemical contamination can be in coastal waters. Industrial discharges of DDT, a highly toxic pesticide, were dumped into Santa Monica Bay by a chemical company for more than 20 years. Although production of DDT was banned in 1972, the sediments in Santa Monica Bay are still contaminated with this pesticide and contain hotspots with the highest levels of DDT reported for any marine envi-

FDA advises against eating seafood when chemical contamination surpasses these action levels. However, with the exception of PCBs, these levels are only informal; they are not enforceable limits.

Source: FDA Action Levels for Poisonous or Deleterious Substances in Human Food and Animal Food. Government Accounting Office "Seafood Safety"

Chemical Substance[a]	Seafood Group	Action level (parts per million)
Aldrin and dieldrin	Fish	.3
Benzine hexachloride	Frogs legs	.3
Chlordane	Fish	.3
DDT, DDE, and TDE[b]	Fish	5.0
Endrin	Fish and shellfish	.3
Heptachlor and heptachlor epoxide	Fish and shellfish	.3
Kepone (chlordecone)	Crabmeat	.4
	Fish and shellfish	.3
Mercury (methyl mercury)	Fish, shellfish, and crustaceans and other aquatic animals	1.0
Mirex	Fish and shellfish	.1
PCBs[c]	Fish	2.0
Toxaphene	Fish	5.0

[a] Paralytic shellfish toxin was intentionally excluded from this appendix because it is a biologically produced chemical toxin.

[b] When amounts of DDT, DDE, and TDE are added, any of the three found below .2 parts per million for fish is not counted for compliance purposes.

[c] PCBs found at 2 parts per million in fish are the only poisonous or deleterious substances for which FDA has established a tolerance level that is promulgated through FDA's official rulemaking process.

***Hepatitis** — Inflammation of the liver; can be caused by water-borne microorganisms.*

***Gastroenteritis** — Inflammation of the stomach and intestines caused by water-borne microorganisms, causing nausea, vomiting, fever, and other symptoms.*

ronment in the U.S. Some fish in the area still have high levels of DDT today. For example, the average levels for Dover sole in 1986 was 6 ppm, although some levels ranged as high as 12 ppm. These levels are above FDA's 5 ppm action level.

The federal government does not have a comprehensive inspection program to protect consumers from chemical contaminants in seafood. FDA's only formal regulatory limit for chemicals in seafood is a limit of 2 ppm for PCBs. In addition, FDA has informal action levels in fish and shellfish for mercury, one of the toxic metals, and for 12 toxic pesticides, including aldrin, dieldrin, chlordane, DDT, endrin, heptachlor, kepone, mirex, and toxaphene. However, while FDA strongly recommends against sale and distribution of any fish with a higher level of contamination, these action levels are not enforceable limits.

Nor are there regulatory limits at all for other known toxic contaminants such as dioxins, PAHs, and toxic metals such as cadmium or lead. Less than one percent of the commercial fish supply is actually sampled by the FDA. What's more, the government does not inspect fish or shellfish caught by recreational fishermen despite serious chemical contamination of many recreational fishing areas.

Bacteria and Viruses. Fish and shellfish contaminated with bacteria or viruses are a major source of food poisoning. Seafood-borne infections can cause a variety of nasty symptoms, including nausea, cramps, diarrhea, fever, and vomiting. Some of these infections are a result of dumping inadequately treated sewage in coastal areas. Sewage often contains disease-causing microorganisms such as *Salmonella, Staphyloccus,* and *Vibrio* bacteria, and the virus that causes infectious hepatitis. When improperly treated sewage is discharged from treatment plants and livestock production facilities into coastal waters, these or-

Hypoxia *— An oxygen deficiency in a waterbody.*

ganisms can survive and contaminate shellfish. Pathogens in food are usually killed by heat during cooking, but eating raw or undercooked shellfish such as oysters or clams can cause serious bacterial and viral infections. New York reported 103 separate outbreaks of viral gastroenteritis involving over 1,000 people in 1982 alone. In rapidly developing areas such as the Gulf of Mexico and the South Atlantic states, bacterial contamination of shellfish harvesting areas is growing more severe.

The FDA, shellfish-producing states, and the shellfish industry cooperatively monitor harvesting areas for microbial contamination under the National Shellfish Sanitation Program, and close those areas with unacceptable levels of microbial contamination. Some of the most productive shellfish harvesting areas have been either closed permanently or are closed periodically after heavy rainfalls because of bacterial contamination. In recent years, 15 percent of tidal zones in Casco Bay, Maine have been closed to clam and mussel digging because of bacterial pollution from the dumping of inadequately treated sewage. In 1985, 57 percent of waters in the Gulf of Mexico were closed periodically or permanently.

Nationwide, waters approved for shellfish harvesting have increased in only seven of 22 coastal states and declined in 12 since 1966. In 1985, commercial shellfish harvests from approximately one-third of the productive shellfish areas in the U.S. were restricted due to actual or potential contamination. More than 80 percent of the 1985 harvest-limited shellfish areas were located along the southern Atlantic coast and in the Gulf of Mexico.

Biological Toxins. Coastal algal blooms such as "red tides" and "brown tides" caused in part by massive nutrient loading from sewage pollution and poison runoff create another kind of health risk for seafood consumers. Biological toxins such as ciguatoxin and paralytic shellfish toxins are produced by these algae. Fish and shellfish eat algae and accumulate these toxins, sometimes concentrating them to very high levels. These substances can cause severe food poisoning such as red tide paralytic shellfish poisoning in humans.

photo by Peter Menzel

9

Diseased and Dying Marine Life

Chemical contamination of coastal waters hurts marine life. In heavily contaminated areas, fish and shellfish have developed physiological and genetic defects such as tumors in fish and chemical burns on lobster and crab shells. The most severe problems are found in non-migratory, bottom-feeding fish near toxic hotspots located around discharge points near urban and industrial areas. Bottom-dwelling fish caught in areas of heavily contaminated sediments exhibit a variety of abnormalities, including liver tumors, fin erosion, and cancerous lesions.

The stress on some of these fish and shellfish populations is substantial. The EPA, for instance, found that 83 percent of the native winter flounder population in Quincy Bay, Massachusetts had liver problems and 23 percent had tumors caused by exposure to toxic chemicals. At one time a rich clam harvesting area, most of the Bay is now closed to shellfishing, and the clam population, under severe stress, has been on the verge of collapse. In fact, EPA researchers had a hard time finding clams to sample.

Other fisheries also exhibiting high rates of tumors in fish populations include English sole in Puget Sound, winter flounder in Boston Harbor and Long Island Sound, starry flounder in San Francisco Bay, white croakers off the coast of Los Angeles, white perch in the Chesapeake Bay, and brown bullhead in Lake Erie and Delaware Bay.

Mass deaths of fish, known as fishkills, occur frequently along the Atlantic coast

Burn holes in lobster shells off the New Jersey coast are attributed to ocean pollution.

Jack Spratt, NYT Pictures

and in the Gulf of Mexico. A primary culprit is hypoxia, a condition of low oxygen levels in the water brought about by a number of factors, including the discharge of oxygen-demanding materials in raw sewage and poison runoff.

Huge areas can be affected by hypoxia. The New York Bight, Chesapeake Bay, and coastal Louisiana routinely suffer from hypoxic events resulting in fishkills.

Polluted Beaches

Recreational beaches are also victims of coastal pollution. High levels of bacteria in waters are responsible for many temporary or permanent beach closures, particularly along the North Atlantic coast. Between Memorial Day weekend and June 21, 1989, more than 40 beaches were closed in New York, New Jersey, and Connecticut because of sewage contamination. Bathing in sewage-contaminated waters can cause a variety of illnesses, and outbreaks of water-borne viral diseases such as hepatitis and viral gastroenteritis are on the rise. Skin ailments also result from contact with sewage-contaminated water. To protect public health, beaches are often closed when bacteria levels exceed levels considered safe for human exposure.

Worse still, even supposedly clean beaches are far from safe. In setting "safe" levels for bacteria in coastal waters, EPA assumes that 19 out of every 1,000 swimmers will become ill with gastroenteritis. Because of the high variability of bacteria content from day to day, your chances of getting ill increase as you spend more days in the water. While individual states are free to set stricter standards, many have simply adopted EPA's standard as their own.

Beaches have also been closed because of medical wastes. Used syringes, needles, bandages, colostomy bags, catheter and IV tubing, blood vials, and surgical gloves washing up on shore contribute to the destruction of the shores and pose a hazard to public health. Although there are presently no records of disease contraction from medical waste on the beaches, needles and other sharp objects pose a risk of puncture.

The full extent to which medical waste is improperly or carelessly controlled is unknown. NRDC's records show that medical waste has washed up on the shores of at least 17 states, including New York, New Jersey, Massachusetts, Maryland, Connecticut, Rhode Island, Florida, California, North Carolina, Ohio, and Texas. The U.S. Navy was responsible for certain dumping incidents in California, Florida, and North Carolina.

The lack of controls on the segregation, packaging, labeling, transportation, tracking, treatment, and disposal of medical waste has been exacerbated by the absence of a federal program that ensures minimum, uniform requirements. The need for such a federal program was never more evident than during the summer of 1988 when more than 100 miles of the East Coast were forced to close.

2 HOW WE POLLUTE OUR OCEANS

Atlantic City Press

Despite considerable progress in pollution control over the past two decades, factories still continue to release large amounts of dangerous pollutants into coastal waters. Each time we flush the toilet we send from two to ten gallons of our own pollution to our local public sewage treatment plants, which in turn discharge wastes into public waters. At least half of all water pollution comes from poison runoff from farms, residential lawns, city streets, and construction sites.

Pollution from Factories

Factories use tremendous amounts of water. It takes 27,000 to 32,000 gallons of water to produce a ton of paper, and 3,000 to 7,000 of these gallons are discharged as wastewater. All told, more than four out of every ten gallons of water used in the U.S. are for industrial purposes. The amount of water used by factories each decade would fill Lake Erie. Typically, one out of five gallons used actually becomes part of the products made. The rest is released back to coastal and inland waters.

Discharged industrial water is often not clean. It can be mixed with thousands of different chemicals. If released untreated, this toxic soup can kill marine life, contaminate food supplies, and endanger people who use waters for fishing, swimming, or drinking.

About 1,300 factories nationwide dump a total of about five trillion gallons a year directly into coastal waters. About half of these are along the East Coast, with the rest split nearly evenly between the Gulf and West coasts. Most of these discharges are to relatively shallow, sensitive waters close to shore. In addition to these direct coastal discharges, much of the industrial pollution released into inland rivers eventually reaches the ocean.

While strict new controls requiring major U.S. industries to reduce their discharges of toxic pollutants into coastal and inland waters by over 1,000 tons a day have been written into law thanks to pressure from NRDC and other environmental groups, shortcomings in the rules remain. Many factories and many pollutants are not covered. In fact, only about one-third of the nation's factories are covered by the regulations. Even where rules have been issued for a polluting industry, the regulations do not control the full range of dangerous pollutants. Because of these gaps, millions of pounds of uncontrolled toxic pollutants are released into U.S. coastal and inland waters each year. For example, organic solvents such as methyl ethyl ketone, acetone, and methanol are not regulated under EPA's program for limiting toxic discharges even though they are known to be toxic.

Until EPA closes all of the loopholes in its regulations controlling toxic industrial pollution and covers all factories and all toxic pollutants, our coastal waters will continue to deteriorate.

Sewage Pollution

What happens when we flush the toilet? In some cases, our sewage is treated by septic systems. Such systems can create serious environmental problems, generally by polluting groundwater. Polluted groundwater from large concentrations of septic systems can flow eventually into coastal waters.

Often our toilets are connected to a public sewer system, especially if we live in large cities or areas where soils are too rocky or too sandy to allow septic systems. This sewage is sent to a public treatment plant. Though the Clean Water Act calls for plants to treat wastewaters to a minimum level of secondary treatment, in which bacteria consume most of the organic content of wastes and disease-carrying organisms are destroyed, the treatment process is far from perfect.

Treatment leaves wastewater and sewage sludge as end-products. About one-fourth of sewage wastewater is dumped directly into coastal waters even though federal law encourages communities to reuse sewage wastewater for irrigation and similar uses. These discharges alone amount to about 2.3 trillion gallons of sewage waste each year. In addition, another 3.6 trillion gallons of sewage waste each year is released into coastal rivers that eventually reach the sea.

Even properly treated sewage wastewater contains considerable amounts of pollution, including bacteria, biological wastes, and nutrients such as nitrogen and phosphorus. These pollutants reduce oxygen levels in coastal waters and consequently suffocate life in productive waters. Many public sewage plants also accept wastes from factories. Over a trillion gallons per year of wastewater containing hazardous wastes are discharged into sewers by some 160,000 factories. Because public sewage treatment plants are primarily designed to treat household sewage, many toxic metals and organic chemicals from factory wastes go untreated. A 1986 EPA report estimated that without pretreatment, about 41,000 to 57,000 tons of toxic organic chemicals and about 68,000 tons of toxic metals are discharged from factories and other sources into public sewage treatment plants each year. These toxic contaminants end up in our water, in sewage

TABLE 1

Factory wastes are the biggest sources of these coastal pollutants:

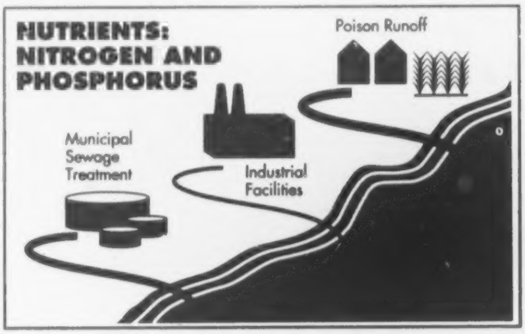
Toxic organic chemicals
Mercury
Arsenic

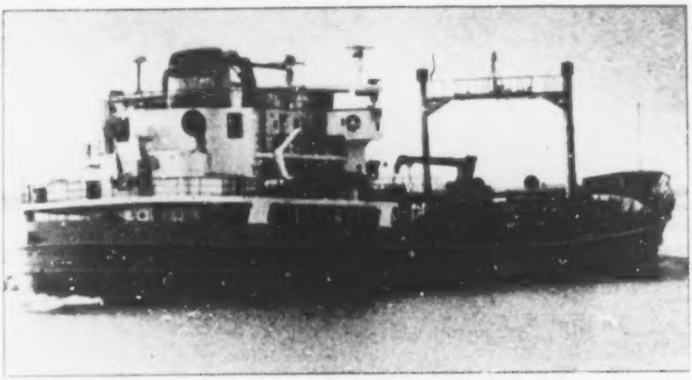
Other factory wastes include:

Biological wastes
Copper
Lead
Zinc
Oil
Chromium

Pretreatment *— A program required by the Clean Water Act where industries must treat toxic wastes before discharging them to public sewer systems.*

The schematic diagrams on the next several pages illustrate major sources of coastal pollution.





Nine New York and New Jersey municipal sewage treatment authorities use sludge barges to dump eight million wet tons of sewage a year directly into the Atlantic Ocean.

John Sotomayor, NYT Pictures

sludge that may be used for fertilizer or soil conditioner, and, in some cases, evaporate into the air we breathe.

Worse yet, some sewage wastewater dumped into coastal waters does not even receive full treatment. It only receives the initial stage of treatment, called primary treatment. This removes only the grossest contaminants via gravity settling or screening.

Even more disturbing, large amounts of sewage wastewater are dumped into coastal waters without receiving any treatment at all. This occurs when sewers designed to carry household and other sewage are combined with storm sewers. Although, generally, combined systems are no longer constructed, 1,100 to 1,200 remain in use across the country, particularly in older neighborhoods of urban areas. When it rains, these combined sewers overflow, bypassing treatment plants, carrying large amounts of raw sewage and other wastes directly into waters used for fishing and swimming. Combined sewer overflow is a threat to human health. It carries medical waste, bacteria, and viruses into coastal waters, contaminating beaches and seafood. Examples of cities with combined sewer overflow problems are Boston and New York.

Sewage sludge is the residue left after sewage treatment. Because sewage treatment plants are not equipped to deal with industrial toxics, the sludge produced is often contaminated with toxic metals such as cadmium, mercury, and lead; PCBs; carcinogenic petroleum compounds; and disease-producing microorganisms.

Some communities dump sludge into the ocean. Nine New York and New Jersey municipal sewage treatment authorities, including New York City, currently dump approximately eight million wet tons of sewage sludge directly into the Atlantic Ocean at a site 106 miles offshore. Until 1986, they used to dump their sludge 12 miles off the New Jersey shore. The site was closed after it virtually became a dead sea. Last summer there were reports of diseased shellfish and fish and reduced catches by fishermen in the waters above the Hudson Canyon, which is located near the new dump site.

BOD *— Biological Oxygen Demand. The quantity of oxygen required by bacteria to break down organic matter in wastewater. Waste with high BOD lowers oxygen levels in water which harms fish and other aquatic life.*

Primary Treatment *— Mechanical filtration, screening, and settling methods for treating wastewater; typically removes 50 to 70 percent of suspended solids and 25 to 40 percent of BOD.*

Secondary Treatment *— Uses bacteria in an aerated tank to break down organic matter (BOD) contained in wastewater; typically removes 85 to 90 percent of the BOD contained in raw wastewater.*

Tertiary Treatment *— Advanced wastewater treatment methods employed in conjunction with secondary treatment such as addition of chemicals to remove phosphorus.*

Fecal coliform *— Normal, intestinal bacteria used as a proxy to estimate quantities of other, harmful bacteria and viruses.*

TABLE 2
Poison runoff pollutants:

Biological wastes
Sediment
Nitrogen
Phosphorus
Chromium
Copper
Lead
Iron
Zinc
Oil
Bacteria

Poison runoff *— Runoff from farming, development, and other land uses contaminated with harmful pollutants such as nutrients, bacteria, toxics, and sediments.*

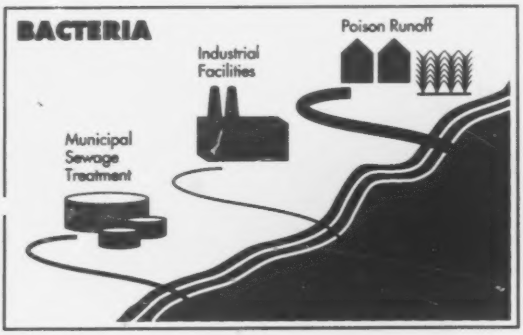
Poison Runoff

Coastal waters are also polluted by poison runoff from city streets, farms, building sites, parking lots, and other common uses of land. In fact, this type of pollution causes at least half of the nation's water pollution. According to figures released by EPA in 1989, of over 17,000 heavily polluted waters nationwide, less than 600 can be tied exclusively to point sources such as factories and sewage plants. The remaining waters are polluted, at least in part, by poison runoff. It is the leading source of many dangerous contaminants.

Poison runoff is increasing. We all contribute to the problem. The major culprit is growth and development. More people living near the coast means more runoff. Because trees, plants, and root systems act as giant sponges, land that is cleared and excavated for houses and condominiums has relatively high water runoff rates compared to undeveloped land.

While the amount of growth in coastal areas has much to do with the amount of poison runoff, the way in which we use land also contributes significantly. For example:

- We use more fertilizer and dangerous pesticides than needed to grow food and other crops. These chemicals run off farmlands and pollute our waters.
- Our homes, shopping centers, and other buildings are surrounded by acres of pavement. Rainwater that runs off these surfaces collects oil, chemicals, and toxic metals from cars and other sources, adding to the input of these pollutants to coastal waters.
- Tree cutting and construction of logging roads too close to waterways cause erosion that increases the sediment load of rivers.
- Even golf courses are a source of poison runoff. The average golf course uses 2-1/2 times as many chemicals per acre as farms just to maintain the quality of the playing surfaces.
- Overuse of fertilizer or lawn chemicals at home causes poison runoff.



The fact that poison runoff is made up largely of soil does not mean it is benign. Large amounts of soil particles in the water smother fish gills, cover critical bottom habitats where fish lay eggs, and choke out submerged grasses, which are a primary food source for waterfowl. The soil particles also contain contaminants. High levels of nutrients in polluted agricultural and urban runoff cause excess growth of tiny algae — a process known as eutrophication. These blooms lower levels of oxygen which may choke coastal waters and result in large fish kills.

EPA has also found at least 67 toxic pollutants in urban runoff. Dangerous in even small amounts, these pollutants threaten human health when they contaminate edible fish and shellfish. They can also be toxic to birds and other wildlife.

Far less progress has been made in cleaning up poison runoff than pollution from factories and sewage treatment plants because it is caused by a much larger number of sources. It is difficult to convince people that while each source contributes only a small amount of pollution, the cumulative effect is devastating.

Alabama Bureau of Tourism and Travel

Coastal Development

Over 50 percent of us live and work in coastal counties. The resulting development is a major contributor to coastal pollution. Typically, the more heavily developed an area of the coast, the more degraded the coastal water quality. It is no surprise that the coastal waters with the highest levels of chemical contamination are near large coastal cities. These include Boston, New York, San Francisco, and San Diego.

The threats to water quality associated with typical coastal development — large condominiums, single family homes and marinas — are primarily from harmful bacteria and nutrients such as phosphorus and nitrogen. The bacteria typically come from failed septic systems or discharges of improperly treated sewage from sewage systems. Excess quantities of bacteria, as well as phosphorus and nitrogen resulting from lawn and garden fertilizers, may reduce oxygen levels in coastal waters below those required by fish and shellfish to survive.

A residential development of 2,300 dwelling units on 300 acres of land could generate 277 lbs./yr. of phosphorus and 2,130 lbs./yr. of nitrogen. A major commercial retailing mall could generate 772 lbs./yr. of nitrogen. Cumulatively, these types of development can have significant adverse impacts on coastal water quality.

Another hidden source of pollution occurs at marina developments. Toxics from anti-fouling paints that have been applied at marinas to recreational and commercial vessels leach into the water and damage important marine organisms, including valuable shellfish. Also, careless boat owners often dump the contents of their onboard toilets directly into coastal waters, a particularly serious problem in and near crowded marinas.

Unless aggressive action is taken, coastal development will become an increasing contributor to coastal pollution. This is particularly true in such states as New Jersey, Maryland, and North Carolina where new development is increasingly located along bays and estuaries. In the Atlantic Ocean drainage basins of New Jersey coastal counties, an average of 16,000 new dwelling units per year were approved from 1985 - 1987. In North Carolina, the permits issued annually under the state's Coastal Area Management Act have more than doubled since 1979. In Florida's coastal counties, the permanent population has grown by 26 percent since 1980 and is projected to grow another 17 percent by 1995. NOAA's Office of Ocean and Marine Assessment estimates that approximately 20 million more people will be living in coastal counties in the year 2000 than in 1980, a 24 percent increase.

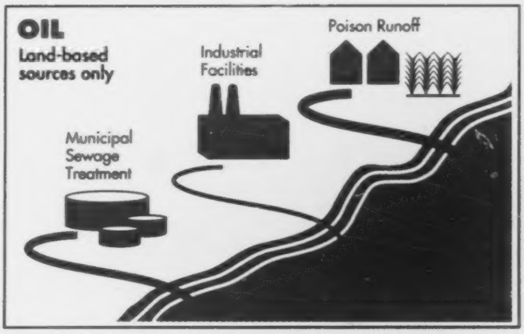
Ocean Dumping of Dredged Spoils

Each year, the Army Corps of Engineers dredges some 500 to 700 million cubic yards of material from harbors and channels. As much as 35 million cubic yards is highly contaminated with toxic materials, including pesticides, heavy metals, PCBs, and oil.

Much of this dredged material, or spoil, is dumped in the ocean. Even clean sediment that is dredged and dumped can have serious consequences for ocean life. For example, bottom areas rich in shellfish, crab, and flatfish can be smothered by dumped sediment. The problem may be persistent. Many bottom-dwelling fish such as sole and flounder are connoisseurs of mud. They require smooth, flat bottoms of certain consistencies. Spoil can disturb or degrade the contour and consistency of the bottom. Dumping in the presence of currents can carry silt and clay particles for miles. Marine plants such as kelp can suffer.

Where the dredged materials are toxic, there are special problems. Many studies have demonstrated the connection between contaminated sediments and contaminants in fish and shellfish. These species bioaccumulate toxics, and thereby make the poisons available to organisms higher in the food chain, including seals, otters, birds, and humans. Dredged materials suspended in the water expose marine mammals to contaminants.

The extent of sediment contamination around the country varies considerably. In some areas, such as portions of Puget Sound, sediment contamination is so severe that marine areas have been designated Superfund sites.



Oil Spills and Offshore Oil Discharges

Perhaps no type of coastal pollution is more dramatic than a catastrophic oil spill such as the one that recently occurred in Prince William Sound. The *Exxon Valdez* tanker spewed 11 million gallons of crude oil into the marine environment, oiling over 800 miles of pristine shoreline, killing at least 100,000 seabirds and 800 sea otters, closing the herring fishery for at least an entire season, and threatening the region's valuable salmon fishery. The bald eagle population in the area may be cut in half. It will take years before the full

Seabirds are especially vulnerable to coating from spilled oil. It causes them to lose their buoyancy and drown. When they preen their feathers, they ingest the toxic substance and are poisoned, usually fatally.

Alaska Department of Fish and Game

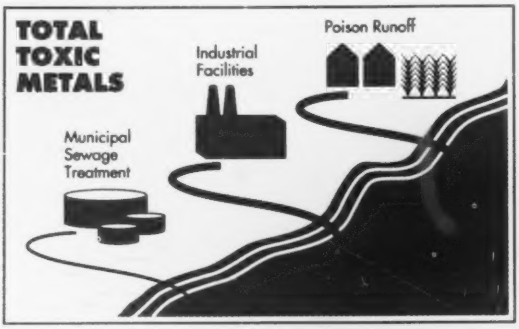
extent of the ecological damage is determined.

The disaster underscores the fact that oil spills of such magnitude do occur despite industry assurances to the contrary. When they occur, industry's ability to contain and clean up such spills is woefully inadequate. And smaller but still harmful spills this year in Delaware, Texas, and Rhode Island show that oil spills can occur with disturbing frequency. The fact is, oil spills are a major risk to the marine environment. Oil in marine and coastal environments can have devastating impacts. Petroleum hydrocarbons are extremely toxic to a wide variety of marine organisms at very low concentrations. In addition to direct lethal effects, petroleum hydrocarbons exert sublethal effects, including reduced growth, altered feeding behavior, and lower reproductive success. Oil spills have produced mortalities of birds, marine mammals, and fish and their eggs and larvae, as well as decreased fish growth rates, spawning inhibition, and declines in fish catches. Oil spilled in sheltered lagoons and wetlands may persist in sediments for decades where it can continue to affect bottom-dwelling organisms. Oil spilled in West Falmouth, Massachusetts, after the barge *Florida* ran aground in 1969, remained in the sediment for at least 13 years. Scientists say it suppressed crab populations for several years.

Offshore drilling operations, as well as tanker transportation, can cause coastal pollution. They also generate huge quantities of waste materials, most notably drilling muds, which lubricate the drill bit and maintain downhole pressure, and cuttings, pieces of rock ground by the bit that are coated with mud. Each time a well is drilled offshore, an average of 1,500 to 2,000 tons of drilling muds and cuttings are produced and must be disposed. This is usually accomplished by discharge into surrounding waters.

EPA estimates that the total annual BOD from these ocean-discharged muds and cuttings may be more than six times higher than the total BOD of all ocean-dumped municipal sewage sludge. Drilling muds also contain significant amounts of toxic pollutants, including cadmium, copper, antimony, arsenic, lead, and mercury.

In addition, produced water — water in the formation that is produced along with oil — is generated in tremendous quantities by offshore production operations. The oil industry has estimated that over 1.5 million barrels of produced water are discharged into the



Gulf of Mexico each day as a result of offshore oil and gas production operations. Produced water often contains large amounts of dissolved or emulsified oil and grease, as well as large quantities of toxic pollutants.

Plastics and Floatables

Marine life and beaches are affected by nonbiodegradable plastic and styrofoam objects, such as packing beads and pellets, fish nets, and beverage can yokes. Plastic is extremely persistent in the marine environment and reduces the aesthetic quality of our coasts. The principal harmful effect of plastic litter is felt by marine mammals, birds, and fish that ingest or become entangled in the debris. An estimated 100,000 marine mammals, such as seals and sea lions, and thousands of birds die annually from ingesting or becoming entangled in plastic. In a recent incident on Long Island, 11 of 15 beached leatherback turtles had plastic bags blocking their stomach openings. Turtles apparently mistake the bags for jellyfish, a favorite food.

Although the amount of nonbiodegradable litter disposed in the marine environment is unknown, its sources are well documented. Commercial fisheries lose large quantities of plastic nets, and recreational and commercial vessels often dispose of their wastes at sea. Land-based activities, such as poor solid-waste handling and antiquated sewer systems, are additional sources of plastics to the coastal ocean.

Even the most remote areas of our coastline are plagued by plastic litter. However, nearshore waters and coastlines near urban areas and major shipping lanes are the most affected. The western Gulf Coast beaches are the most littered in the nation. Over 65 percent of litter on Texas beaches is plastic and foam. Experts have called Padre Island National Seashore one of the dirtiest stretches of coastline in the country.

Improper disposal of plastics and litter not only detracts aesthetically, but poses a hazard to wildlife as well.

Atlantic City Press

3

ACTIONS FOR CLEANING UP COASTAL WATERS

Cleaning and protecting the nation's coastal resources will take a national effort. NRDC has identified the ways and means to help end coastal pollution and restore the health of our coastal waters. Controlling industrial discharges, sewage, poison runoff, coastal development, oil spills, and medical waste will help prevent beach closures, fish contamination, and risks to human health.

Control Factory Discharges

We need to eliminate the toxic water pollutants from both municipal treatment plants and industrial facilities. Certain steps can be taken right now; others will require that federal and state governments immediately begin to develop new, badly needed regulations.

We must enforce the current law. National standards exist today to control the discharge of toxic pollutants from factories — both plants that discharge directly into our coastal waters and those that send their wastes to municipal plants for further treatment before discharge. A recent government study showed that present-day enforcement of these rules is far from adequate: nearly half the programs to control industrial waste reaching municipal treatment plants were found to be in violation of minimum national standards, and at least four out of every ten discharges of toxic wastes into sewage plants violate their permits. Until a real commitment to enforcing current law and rules is made, we will not control this problem. Such enforcement can have dramatic results. For example, a 1989 study by the Chesapeake Bay Foundation reported a 50 percent drop in levels of chromium, copper, and nickel in the effluent of Baltimore's Back River sewage plant following enactment of an industrial pretreatment program.

We urgently need new rules for problem industries. A 1986 EPA study found that national rules setting minimum treatment standards for a number of industries that use very toxic chemicals were lacking.

EPA has developed regulations to cover only part of the total list of toxic chemicals discharged by many industries. For instance, organic chemical

TABLE 3

Examples of major industries that release more than a million pounds of toxic water pollutants per year:

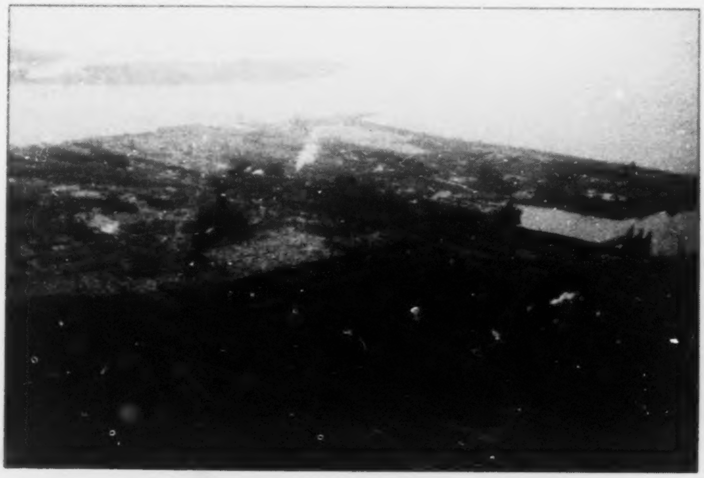
- Pharmaceuticals
- Equipment Manufacturing
- Textile Mills
- Coal Mining
- Iron and Steel
- Leather Tanning
- Metal Finishing
- Ore Mining
- Oil Refining
- Pulp and Paper Mills
- Chemical Producers

manufacturers discharge about 2.5 pounds of unregulated toxics for every pound of regulated toxics discharged. Clearly, current efforts to regulate discharge of industrial toxics to coastal waters need to be greatly augmented. We need a moratorium on new discharges that cause or contribute to violations of coastal water quality. One of the main problems in estuarine and coastal waters is the cumulative impact of many different sources of toxic contamination. Each new discharger may add only a relatively small amount of mercury, lead, or benzene to the water; but, taken together, these discharges add up to a major water quality problem.

The time has come to say nobody has a right to pollute. We also propose that no discharge permits should be issued to new factories seeking to discharge toxic wastes into coastal waters and no old permits should be renewed unless the discharger shows that it has made every conceivable effort to deal with its wastes in some other environmentally sound way such as waste reduction or recycling.

Control of factory pollution can be successful. An example can be found in Connecticut. The Naugatuck River, which also flows into the Housatonic River and Long Island Sound, was formerly one of the most polluted rivers in the country. Strict controls on metal finishing plant discharges resulted in much lower levels of toxic pollutants. Experimental trout stocking is now taking place in the upper reaches of the river.

Still another case of successful pollution controls involves the Delaware River Estuary. EPA conducted a study of the effect of industrial pollution controls on 64 factories and 10 toxic pollutants. It found sharp reductions in these pollutants throughout the estuary. In the zone where saltwater mixes with freshwater, levels of cadmium and mercury have decreased by 91 percent and 55 percent, respectively, over approximately the past 10 years.



Controlling industrial discharges is necessary if we are to clean coastal waters.

Improve Sewage Treatment

We need to build more and better sewage treatment plants. Where there are people, there is the problem of sewage treatment. And where there is inadequate sewage treatment, there is water pollution. Since current population density is greatest in coastal areas, and since more people are moving towards the coasts every day, it comes as no surprise that the need for new or upgraded treatment plant construction over the next two decades is expected to be concentrated in the coastal states. Coastal counties experienced a 69 percent population increase between 1950 and 1980; NOAA's Office of Oceanography and Marine Assessment predicts that between 1980 and 2000, there will be an additional 24 percent population increase. (This figure does not include the Great Lakes.)

Despite a national push to improve municipal sewage treatment facilities — from 1972 through 1986, the federal government awarded over $40 billion in grants to help cover the cost of building and upgrading municipal sewage plants while states and localities spent another $73 billion — more needs to be done.

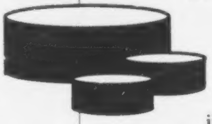
And what has been done already often isn't enough. For example, since the late 1960s and early 1970s, some Gulf Coast locations have significantly reduced the levels of nutrients and oxygen-demanding chemicals discharged from municipal and industrial sewage treatment plants. As a result, major fish kills caused by low oxygen levels have been reduced, and in some areas there has been a reduction in levels of disease-causing bacteria. But a rapid population rise, along with continued industrial development and dredged spoil disposal, is threatening to overwhelm this progress.

San Francisco Bay has also seen improvements that have not gone far enough. Wastewater treatment plants have contributed to some marked reductions in environmental impacts from industrial and municipal discharges since the early 1960s, but problems persist because major volumes of pollutants continue to be discharged — ranging from disease-bearing organisms to toxic heavy metals and PCBs.

There is no getting around the fact that we need to keep up with the need for construction of more and better sewage treatment plants. EPA found that 6,248 treatment facilities presently have documented water quality or public health problems. The agency's 1988 assessment of the cost for the facilities we will need by the year 2008 (not counting the costs of operating and maintaining them properly) was $83.5 billion. That's over $350 for every American. A combination of federal, state, and local efforts will be needed to prevent this backlog from growing worse.

We also need to take steps to cut back the need for new facilities. Several things can be done to try to reduce the volume of wastewater requiring treatment. First and foremost, water efficiency should become a way of life for all citizens. According to some estimates, more efficient home plumbing products like the 1.6-gallon flush toilet could save 40 percent of the water presently used in American houses. In addition to saving water, energy, and money at the water supply end, it also saves money and reduces pollution at the waste treatment end. Legislation mandating plumbing efficiency standards for all newly-constructed or renovated buildings is now pending in Congress, and similar laws have passed already in several states. We need these national plumbing efficiency standards as soon as possible.

We also need to close the loopholes and improve the level of treatment. As a general rule, the Clean Water Act establishes a bottom line for the amount of treatment that must be given to sewage effluent before it can be discharged into our waterways. But the law today also includes a loophole for coastal treatment plants. Under certain circumstances, coastal plants are allowed to discharge sewage into the ocean with less treatment than would be allowed for inland treatment plants. As of January 1987, EPA had approved 46 such exceptions, most of them on the West Coast.



Is this loophole appropriate? We don't think so. Coastal waters bear the brunt of pollution, both from pipes and from poison runoff. Our overstressed coastal waters should not be taxed still further by giving coastal treatment facilities this free break.

We need to reuse water, not throw it away. It is far better to look at creative and effective new means for treating municipal sewage and making use of the effluent resource than simply to dump wastewater in estuaries or the ocean. For example, Arcata, California has developed an alternative to pumping treated sewage into nearby Humboldt Bay. The town has constructed an artificial wetland to which sewage that has received initial treatment is directed for further natural filtration and cleansing. The facility doubles as the Arcata Marsh and Wildlife Sanctuary, attracting birds and wildlife as well as wildlife enthusiasts. Clean sewage effluent also can be used to irrigate crops, forests, or parklands; for industrial cooling or processed water; or to replenish groundwater supplies. Of course, for some of these uses the sewage effluent must be more thoroughly treated and free of industrial toxics.

We need to end overflows from combined sewer systems. It is time to address the water quality impacts from combined stormwater and sewage collection systems that overflow into marine waters. EPA estimates that these types of systems carry the wastes of 12 million people.

The best long-term solution to the problem of combined sewer overflows is to require adequate treatment. The wastewater leaving a combined sewer system should be treated just as it would be if it were to reach the sewage treatment plant. It should not be dumped untreated into our coastal waters. Shorter-term solutions include eliminating outfall points wherever possible, increasing the capacity of sewage plants, and building storage and treatment facilities for sewer overflows.

There are technological solutions to control combined sewer overflows, although they are not free. Devices can be constructed to hold stormwater flows until a storm event is over so that the water then can be sent to the treatment plant. Or the pipes in the sewage system itself can be used as a retention basin with flows released to the treatment plant over time as the storm abates.

Another way to curb overflows is through an increased focus on water use efficiency both in homes, and by industrial dischargers who nationally contribute about 12 percent of total wastewater flow to sewage treatment plants. EPA and the states have authority to impose water conservation and reuse requirements on industrial facilities that discharge wastewaters to coastal plants. They should exercise it more often.

Revise Pollutant Limits to Protect Water Quality

We need to revise the limits set on the amount of pollution a factory or sewage treatment plant is allowed to discharge. Contrary to popular belief, these limits are not always based on protecting the river, lake, or ocean water that the discharge enters. Instead, they are often based on so-called technology standards.

Routine water sampling can help make sure factories and sewage treatment plants are staying within pollutant limits.

Jessica Landman

Imagine a steel plant that discharges a million gallons of wastewater a day into Chesapeake Bay. Mixed in with the wastewater is 1,000 pounds of cyanide — the amount that would be discharged without any controls. In writing a permit for the factory, the regulatory agency examines the manufacturing process used and the kind of wastewater discharged. It then looks at the various treatment technologies available for removing pollutants from the discharge. The agency selects the best available technology (BAT) and requires the factory to install that equipment.

What result does this have for water quality? That depends on just how good the BAT is. In the case of the steel plant, if the BAT will remove only 80 percent of the cyanide, the plant will get a permit that lets it discharge 200 pounds of cyanide a day without regard to the effect the discharge will have on water quality.

A better, more environmentally conscious way to write permits is to base them on the stricter of the technology-based standards, or on the effect of the discharge on the receiving waters with a goal of maintaining the quality of pristine waters and improving the health of degraded waters. This requires studying the effects of pollutants on marine ecosystems and determining the amount of pollutants that can be present in the body of water without degrading it. The total load of cyanide that a stream may be capable of absorbing without degradation may, if it has a small volume, be zero. If that is the case, a permit based on water quality limits would not allow the discharge of any cyanide.

In fact, this type of water quality-based control is required by the federal Clean Water Act. Unfortunately, according to a 1989 Government Accounting Office report, few permits are actually written this way. Coastal waters will begin to be better protected if states write permits that reflect actual local water quality problems.

End Sewage Sludge Dumping

We need to phase-out and terminate ocean dumping of sewage sludge. This is an important step toward securing a clean and productive environment. Significant groundwork has already been laid in this respect. In 1988, Congress responded to enormous public pressure and enacted the Ocean Dumping Ban Act of 1988, which requires EPA to force a phase-out of dumping.

The new law sets a December 31, 1991 deadline for the end of ocean disposal of sludge. It also declares that any ocean dumping of sludge will be illegal after August 4, 1989, unless EPA has both issued to the municipality a permit to continue dumping and has entered into a satisfactory agreement with the municipality to stop ocean dumping as soon as it can.

Permitted municipalities that cannot meet the 1991 deadline will have to begin paying per-ton dumping fees into an escrow account beginning in August 1989, and will pay increasing penalties for every year dumping continues.

The Act opens the way for the complete and systematic end of ocean dumping. EPA has the power to preclude the risk of lingering dumpers and to lead the dumpers toward environmentally protective long-term solutions. Much is at stake in the discharge of EPA's obligations. Both the health of the ocean environment and the health of the land environment will be affected by decisions under this Act. The dual challenge to EPA officials is to get dumpers out of the ocean and to accomplish this in a way that does not spawn a generation of new problems on land or in the air.

There are alternatives to sludge dumping. Seattle, for instance, ships its sludge to forests where it is sprayed on saplings, substantially increasing their growth rates. Chicago and Portland and Salem, Oregon regularly use their sludge to fertilize local farms and plant nurseries. Milwaukee has been converting its sludge to a soil conditioner for the last 62 years.

Limit Poison Runoff

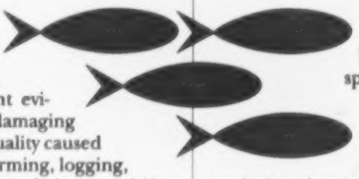
We need to control poison runoff if we are to restore and protect our coastal waters. A great deal still remains to be learned about the science of poison runoff. We don't know, for example, which agricultural chemicals cause the most harm to wildlife. Nevertheless, we already have plenty of information about what types of poison runoff controls work best.

NRDC recently completed a major two-year study of the ways and means to control poison runoff, entitled *Poison Runoff: A Guide to State and Local Control of Nonpoint Source Water Pollution.* We concluded that the tools available to us today can do the job, but we need to make a major political and financial commitment if they are to work.

So far, many states have been slow to control poison runoff. A reluctance to act comes from several sources. First, there is a shortage of money from the federal government. Congress has not agreed to spend the $400 million in grant funds it authorized in 1987 to help states get their programs moving. Second, states are reluctant to shake up the status quo. For example, state officials do not like to regulate farmers. They prefer to rely on purely voluntary programs to control agricultural chemicals and soil erosion. Nor do they like to tell people what they can and cannot do on their land. Traditionally, this has been the job of local government.

This reluctance must be overcome. Some of the ways in which we do business will have to change. Many of the changes we need to make have already been implemented regionally. Several regions and states have already initiated effective programs to control poison runoff. In many cases, these programs were developed to deal with a localized crisis of contamination. They can serve as models and be adapted by other areas to suit specific needs.

There are steps we can take right now to stop the spread of poison runoff. We need to pull back from the water's edge. There is abundant evidence that the damaging effects on water quality caused by activities like farming, logging, and grazing are greatly increased if they are allowed to occur right up to the riverbank or tidal zone. For example, manure piles from chicken farms in the Chesapeake Bay watershed located right next to the Bay's tributary streams cause bacteria and other contaminants to wash into the Bay and coastal waters. Similarly, plowing the soil right up to the edge of a stream causes the runoff of soil particles, chemical fertilizers, and pesticides into the stream and out into the coastal waters as soon as it rains.



We know that very simple changes in farming or animal management practices can greatly reduce these impacts. Leaving filter strips of undisturbed natural vegetation such as trees and grasses between the plowed field and the river or tidal wetland can provide excellent natural protection against agricultural runoff. Relocating the manure pile away from the water's edge and constructing a drainage and treatment system for runoff from the pile can eliminate the uncontrolled release of pollution from a chicken or dairy farming operation. Constructing fences along streambanks prevents cattle from grazing too close to the erodible bank.

Historically, these best management practices (BMP) have not been imposed upon farmers by federal, state, or local government officials. While voluntary cost sharing programs under which federal or state funds are given to farmers to subsidize the costs of implementing BMPs like creating filter strips or constructing manure management systems have been around for a long time, participation has not been widespread enough to protect water quality. The time has come to establish sensible controls on agricultural activities in all coastal watersheds threatened by poison runoff.

As with agriculture, urban and suburban activities that disturb land at the water's edge can and must be regulated to halt the decline of water quality. Because of the lucrative nature of coastal real estate, few coastal communities have adequate incentives to control growth. Local planning and zoning officials must re-orient their thinking to take water quality impacts from runoff into account. They must require that construction and earth-moving activities be conducted in ways that do not cause erosion. They also must require and enforce design standards that greatly reduce the amount of pavement that is installed along with new development.

We can also require coastal communities to treat poison runoff before it reaches our coastal waters. Though current federal law phases in treatment requirements, some communities will not be required to begin treatment until 1993, and some coastal areas may escape these poison runoff controls altogether. For some polluted waters, this is too little, too late.

Protect Clean Waters

We need to protect waters that are already clean. Since many coastal waters are badly polluted, there is a natural tendency to focus our efforts on cleanup. But some of our coastal waters are still relatively clean and as growth in the coastal region continues, these waters become threatened as well. It is equally important to make sure that these waters stay clean.

EPA and many states have antidegradation rules designed to keep clean waters clean. Typically, citizens can petition their states to designate clean and valuable waters for special protection. Often they are known as Outstanding Resource Waters; they include waters of parks and wildlife refuges, or other waters with special ecological or recreational value. Unfortunately, these rules have not been used frequently enough.

Citizens can spur this process on by insisting that their state have a strong antidegradation program and by petitioning the state to designate waters for special protection. Once designated, the state should make sure that these pristine waters stay clean by:

- prohibiting new or increased pollution discharges from factories and sewage plants
- stopping or imposing strict controls on new developments that will cause poison runoff
- purchasing or taking steps to protect important coastal habitats, such as valuable wetlands, that support these special protection waters.

Govern Coastal Development

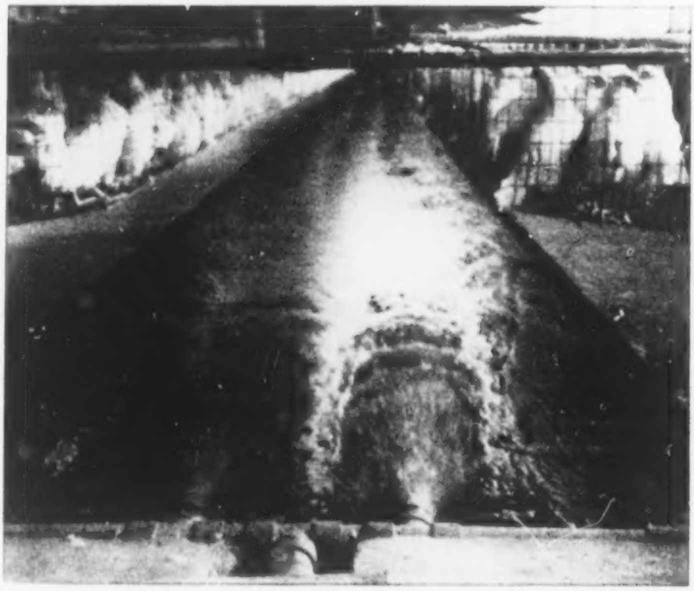
We need to limit the density of development allowed along the coastline and require that it be set back from the water. This will limit the amount of sewage, fertilizers, and other runoff that enters coastal waters. Examples of coastal development controls can be found on both sides of the continent. In response to the declining conditions in the Chesapeake Bay, for instance, Maryland established the Chesapeake Bay Critical Area Commission which limits the density of development along significant sections of bayfront to one dwelling per 20 acres. Under local coastal plans in several California counties, density limits for nearshore development along portions of the coast range from one unit per five acres to one unit per 640 acres. with an average of one unit per 20 to 40 acres.

Density restrictions are particularly important for areas with high water tables and porous soils since pollution can easily filter down into groundwater, thereby threatening drinking water supplies and coastal waters.

Setback requirements or buffer zones are another important way to limit the adverse effects of development. Rhode Island has adopted a setback of 200 feet for all new development along the perimeter of salt ponds in order to protect water quality. Such undisturbed buffers zones can check the flow of pollutants into coastal waters.

Another way to protect coastal waters is to require that any major development proposed along the coast, before being approved, first demonstrate that it will not degrade coastal water quality nor interfere with current uses of coastal waters (such as shellfishing). North Carolina's coastal program currently contains such a requirement.

Finally, requiring new developments to have effective stormwater management plans is an important tool for abating coastal pollution. Such plans should: 1) limit the amount of built-upon surface allowed as part of a project to a small percentage (e.g., no more than 15 percent of the site may be covered by man-caused impervious surfaces in certain coastal areas in Maryland);



A fast moving stream of water moves chicken manure quickly from a modern hen house into an anaerobic lagoon, thus reducing pollution problems by animal waste.

Frank Jeter, Jr./USDA Soil Conservation Service

2) limit site disturbance and rely on naturally occurring vegetation rather than expansive gardens and lawns which require the use of pesticides and fertilizers; and 3) require the use of retention/detention basins to control runoff from significant storms.

Subsidy Cut-offs. The Coastal Barrier Resources Act od 1982, which prohibits federal development subsidies for designated coastal barrier islands, beaches, and other features, provides an important model for protecting coastal areas from overdevelopment. Cutting off federal development subsidies does not halt development altogether but removes important incentives that encourage such development.

Federal subsidies for development that are banned for units in the Coastal Barrier Resources System (CBRS) include:

- insurance through the National Flood Insurance Program
- federal funding for roads, bridges, water lines, sewers, and other infrastructure
- federal grants and loans for housing.

Eliminating federal subsidies for building on barriers saves taxpayers' money and reduces the loss of life and property that results when flood-prone areas are developed. In addition, fragile coastal ecosystems and the abundant wildlife they support are protected from destructive building and pollution associated with coastal development.

Close to one-half million acres of coastal barriers are protected by the CBRS along the Atlantic and Gulf coasts. The U.S. Department of Interior, which administers the CBRS, has recommended that Congress add another 790,000 acres of undeveloped shoreline along these coasts, but has failed to recommend similar protection for barriers along the Great Lakes and West Coast. Inclusion of all eligible barriers, regardless of their location, would ensure that taxpayers do not subsidize hazardous, environmentally destructive development.

Congress will soon decide whether to adopt the Interior Department's recommendations to protect additional barriers by adding them to the CBRS. It makes good economic and environmental sense to expand the System and extend the approach to other sensitive areas.

Tax Policy. Federal, state, and local tax policy can provide powerful incentives and disincentives for coastal development. Legislatures have recognized the effectiveness of tax policy to protect the environment. Federal, state, and local tax laws, for example, contain provisions specifically designed to prevent undesirable practices in relation to agricultural and timber land.

While the Coastal Barrier Resources Act withdrew most federal financial assistance for development of units in the Coastal Barrier Resources System, it does not deal specifically with tax policy. Furthermore, under present law very few tax incentives or disincentives are directed to coastal conservation objectives. Accordingly, conservation takes a back seat to economic development.

Tax policies to promote coastal protection can be placed in two categories: those that would reduce incentives or provide disincentives to develop coastal regions, and those that would increase incentives to conserve coastal regions.

Federal tax policies to inhibit development in the CBRS and other sensitive coastal areas should eliminate or limit deductions for casualty and other losses and for expenses of development, including supporting facilities; eliminate use of tax-exempt state and local bonds to finance private development activities; and eliminate the favorable tax treatment for investment and development accorded to real estate investment trusts and real estate mortgage investment conduits. All of these measures would significantly reduce the profitability of development while increasing federal tax revenues.

The Tax Reform Act of 1986 eliminated several key provisions of the Internal Revenue Code that had encouraged property development, including the investment tax credit, accelerated depreciation for real property, and preferential taxation of capital gains. Although not specifically directed toward environmental concerns, these changes have helped to inhibit development of coastal areas. Legislative proposals have since been made to reverse certain aspects of the changes. One of the most serious now pending is President Bush's proposal to restore preferential tax rates for certain capital gains. The restoration of such preferential rates, if applicable to real property, would add significantly to pressures for land transactions, leading to higher prices and encouraging speculation in sensitive coastal areas. All such proposals must be resisted unless revised to exclude application within the CBRS and other sensitive coastal areas.

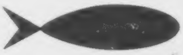
Tax policies to encourage conservation in the CBRS and other coastal areas should include state and local taxation of properties withheld from development based on their value as used, or on some other reduced basis, rather than their higher development value, with the federal government reimbursing in part the lost tax revenues. In addition, federal tax policy should be designed to encourage the gift or sale of land or development rights in land for conservation purposes.

Important environmental protection for sensitive coastal areas can be provided by programs for the purchase by governmental agencies or non-government conservation organizations of land or development rights in land. Federal, state, and local programs should be fostered by dedicating specified tax revenues to that purpose or permitting use of the proceeds of tax-exempt bonds. A number of states already have programs for coastal acquisition from the proceeds of some form of real estate development tax. Maryland's Program Open Space is a good example. It uses

Chris Colwell

a fixed annual sum from land transfer tax revenues for the purchase of development rights and land for open space purposes. Recent bills in Congress have proposed the dedication of specific revenues to purchase open space and for grants to state and local governments to acquire land or development rights.

Minimize Dredged Spoils



We need to minimize the harm associated with the dumping of dredged materials. There are four principal ways. First, improve the tests for toxicity done on the dredged spoil. While EPA requires some testing, not enough of the material to be dumped is actually tested. Furthermore, the tests used are out of date, providing much less useful information than the current state of the art allows.

Second, we must cease disposing hazardous dredged material in the oceans entirely. Dredged materials that meet the standards for hazardous waste should be disposed of in facilities on land that meet EPA hazardous waste facility criteria.

Third, we have to minimize the amount of toxic materials going into dredged sediments. This can be done by reducing the discharge of such toxic substances as oil in harbors and by reducing the pesticide runoff into streams.

Fourth, we should dispose of all nontoxic dredged materials at safe ocean sites. Under federal law, EPA has the duty to designate dumpsites. It should choose sites beyond the continental shelf wherever feasible. Because the richest concentrations of marine life are on the continental shelf, disposal of material in the deeper waters off the shelf is less disruptive to the environment.

Avert Oil Spills/Restrict Offshore Drilling

We need to avert another disaster such as the *Exxon Valdez* oil spill and the three spills in June 1989 along the East and Gulf coasts from occurring. We must take decisive steps now to revise our domestic energy program, permanently protect sensitive areas, and tighten environmental safeguards on the oil industry's operations.

The most pressing need is to place the most sensitive environmental areas off-limits to oil activity. It would be inexcusable to expose such areas as Alaska's Arctic National Wildlife Refuge and Bristol Bay fishery, the Florida Keys, New England's Georges Bank fishery, and sensitive areas of the Pacific and mid-Atlantic coasts to an ecological disaster like the Valdez spill.

To replace the oil and gas thought to underlie these sensitive areas, we must also renew our commitment to conservation and alternative energy sources. These will enhance long-term energy security and carry far fewer environmental risks than the exploration, transport, and burning of fossil fuels.

How realistic is conservation as an alternative to oil exploration and development? An NRDC analysis recently identified an energy conservation resource more than twice as large as the total predicted oil production from sensitive offshore and Alaska lands, based on efficiency improvements in homes, appliances, and vehicles. Merely improving the efficiency of existing oil and gas furnaces and water heaters to the fullest cost-efficient extent would save the equivalent of 4.5 billion barrels of oil. This is roughly the same amount of oil that is believed to be contained in all the most sensitive areas. Moreover, aggressive weatherization programs for America's 53 million oil and gas heated homes would save twice the oil believed to be in these areas. Finally, an increase in fuel efficiency of cars to 40 miles per gallon and of trucks to 30 miles per gallon by the year 2008 would save more than three times the amount of oil.

The oil industry has long told us that the risk of a catastrophic spill is so slight that we need not worry about it. It is now tragically clear how wrong the oil industry is. Simply declaring that "it can't happen here" is no longer an adequate safeguard for our most precious lands and waters. We must also take greater precautions to prevent an oil spill in those areas that are already subject to oil activity. Standards for vessel design should be strengthened to require the use of double hulls, and the Coast Guard should be mandated to independently check vessel pilots' qualifications.

Financial incentives for the oil industry to operate safely must also be dramatically increased. This can be accomplished by raising liability limits for spill damages, revising the tax code so that spill cleanup costs are not deductible from company income taxes, and preventing the industry from passing on cleanup costs to consumers and profiting from a spill through higher oil prices.

Finally, the response of industry and the government to oil spills needs an overhaul. Contingency plans should be reviewed and revised in light of the recent disasters. Detailed and workable procedures must be developed for responding to the maximum potential spill. Sufficient cleanup equipment and personnel must be maintained in constant readiness. A sizeable fund, financed by a fee on industry, should be made available to the government so it can promptly mount an effective cleanup operation when large spills occur.

Create Ocean Sanctuaries

We need to create lasting protection for sensitive ocean areas. One way would be to designate them as special areas and give them specific protective rights. That is the goal of the ocean sanctuary concept. It has evolved over the last few years out of frustration with the federal government's push to produce oil and gas and drill for minerals on the seafloor that would degrade our remaining pristine marine environments.

Ocean sanctuary would protect the integrity of the entire marine environment in a designated area by permitting harvest of renewable food resources, such as fish and marine vegetables, but prohibiting the extraction of fossil fuels, minerals, and other nonrenewable resources. Dumping and burning toxic or other harmful wastes in sanctuary areas would be prohibited, too, as would the transport of any such materials through sanctuary areas.

Although the ocean sanctuary concept has potentially broad application, currently the only active proposal is a bill introduced in Congress to designate a sanctuary off the coast of California. Legislators and activists from other threatened areas such as Florida, Alaska, and New England have begun a movement to designate these as "Wilderness Areas in the Sea."

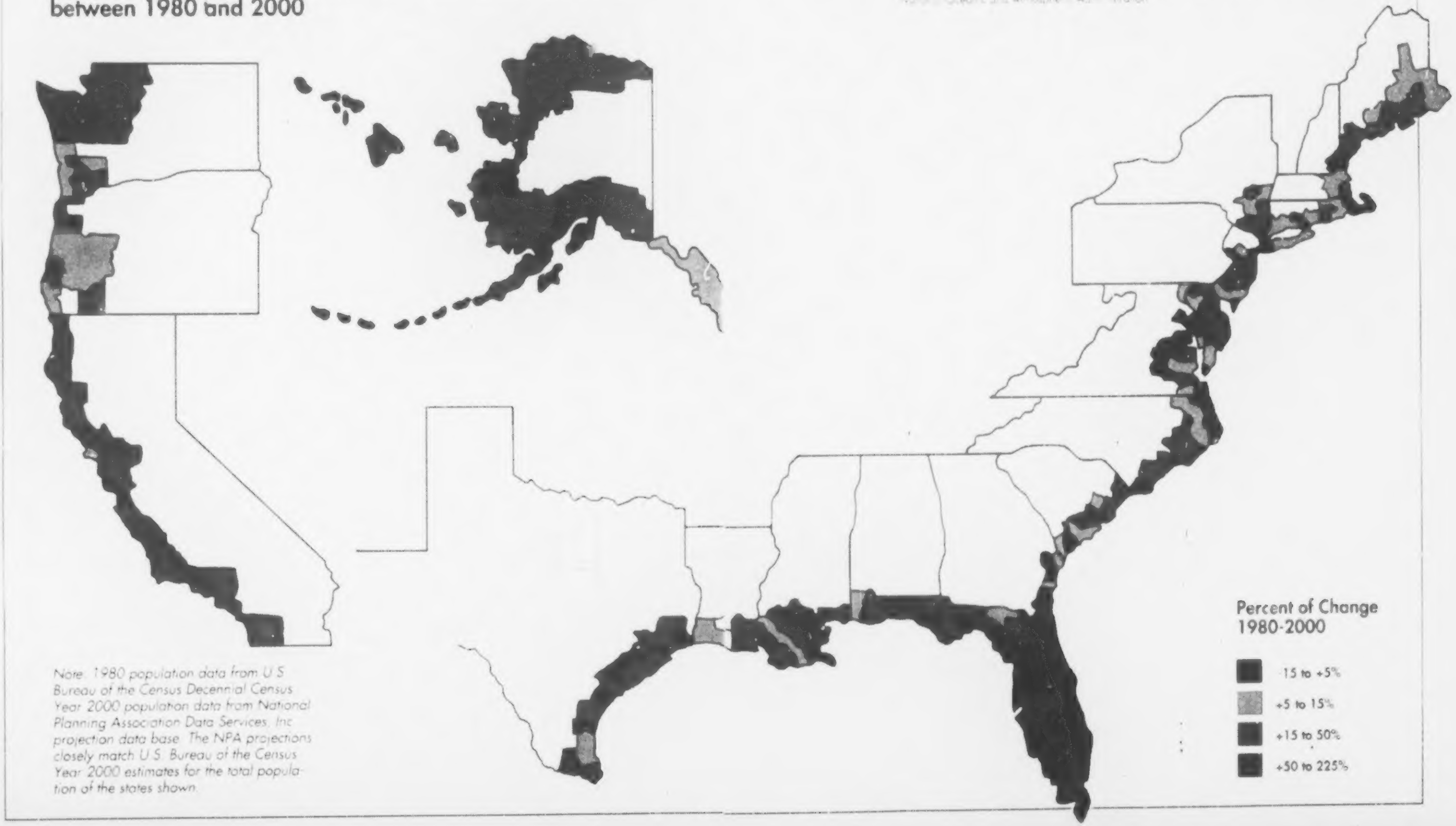
Control Medical Waste

We need to keep better track of the disposal of medical waste to make sure it doesn't wash up onshore and threaten human health. In response to public outrage over last summer's beach closures due to medical waste, Congress moved with unusual speed in enacting legislation directing EPA to track medical waste and prohibiting its ocean disposal. A two-year demonstration program, the Medical Waste Tracking Act of 1988 represents a modest beginning in the effort to ensure minimum, uniform federal requirements for managing medical waste. In addition to addressing the public health concerns, the statute recognizes the aesthetic and environmental values violated by medical waste washups.

The cornerstone of the Act is the es-

Projected Change in Population of U.S. Coastal Counties between 1980 and 2000

Source: Strategic Assessment Branch, Ocean Assessments Division, Office of Oceanography and Marine Assessment, National Ocean Service, National Oceanic and Atmospheric Administration



Note: 1980 population data from U.S. Bureau of the Census Decennial Census. Year 2000 population data from National Planning Association Data Services, Inc. projection data base. The NPA projections closely match U.S. Bureau of the Census Year 2000 estimates for the total population of the states shown.

Richard Frieman

tablishment of a tracking program and a manifest system for wastes moving offsite for treatment and disposal. Congress also amended the Clean Water and Ocean Dumping Acts to prohibit the ocean disposal of medical waste and enacted the United States Public Vessel Medical Waste Anti-Dumping Act to restrict dumping by public vessels to very limited circumstances such as war.

The Medical Waste Tracking Act is not a panacea, however. It has a number of weaknesses, the most significant being that it covers only seven states and territories, including New York, New Jersey, Connecticut, Rhode Island, Louisiana, Puerto Rico, and the District of Columbia. The system must be extended to all 50 states because the problem is national in scope. In fact, Michigan and Pennsylvania are experiencing medical waste washups in 1989 even though the states chose not to be a part of the federal tracking system. Additionally, the Act does not address the four principal treatment and disposal practices for medical waste: incineration, steam sterilization, landfilling, and sewage disposal. The statute only requires EPA to study these practices. These activities could, however, pose other, possibly more serious threats to human health and could contribute to the further degradation of coastal areas and waters if left unregulated.

While the tracking rules will help to control the disposal of medical waste, they won't prevent all waste from washing ashore. NRDC believes many aspects of the regulations are deficient and significant sources of floatable waste remain unabated. Clearly, the tracking measures under the Medical Waste Tracking Act are only the first step in bringing medical waste under comprehensive controls. NRDC believes the information gained from the demonstration program under the new Act should be used to institute a permanent national program. Second, the federal government should establish comprehensive operating regulations for medical waste treatment technologies, especially for incinerator air emissions and ash management. Third, sewer disposal of medical waste should be prohibited outright. Discharging medical waste into the sewer system is already prohibited in Switzerland, Sweden, and West Germany.

The problem of medical waste draws attention to the need to control other forms of floatable waste, including plastics. We need to establish and enforce programs to prevent plastics from reaching the ocean. An annex to the International Convention for the Prevention of Pollution from Ships (known as MARPOL) regulates the release of plastics (e.g., garbage bags, synthetic ropes and fishing nets) from sea-going vessels. This annex has been ratified by Congress as the Marine Plastic Pollution Research and Control Act of 1987. Ratification is an important first step to reducing the plastic pollution in our coastal waters. Now the authorities must rigorously enforce the new law.

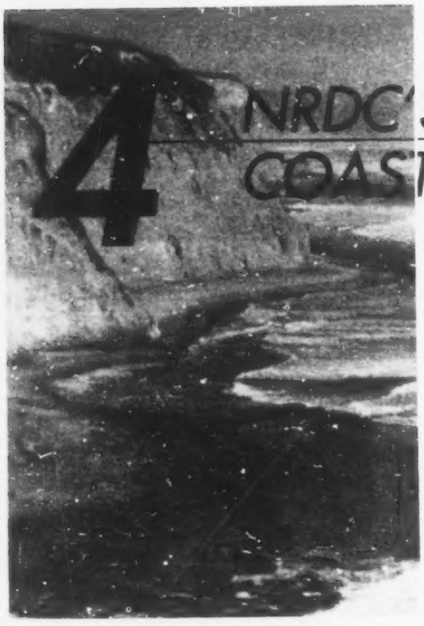
Federal legislation is also needed to phase out the use of nondegradable fishing lines and nets and to replace them with natural fibers or other degradable materials. Most importantly, Congress must act to reduce the amount of plastics and nondegradable materials that our society uses and, and at the same time, create incentives for recycling these materials. Municipalities and states should enact bans on the use of plastics and foams. Environmental groups and citizens should call on manufacturers to use biodegradable packaging for their products.

Dispose Household Hazardous Waste Properly

We need to stop improper disposal of household hazardous wastes such as used oil, cleaning solvents, and batteries. Frequently, they are poured down the drain or disposed of as household trash. This practice poses serious environmental consequences.

Liquid wastes poured down the drain end up in sewage treatment plants that are not always capable of treating such contaminants. Groundwater contamination can occur when household toxics are disposed of in ordinary landfills. Introduction of these hazardous materials into incinerators can cause boiler explosions, toxic air emissions, and contaminated ash.

We need a national program to coordinate and control the collection and separation of household hazardous wastes. Currently no such program exists. While some efforts are being made at state and local levels to control these wastes, most are only one-day events. They are often inadequate. A formalized national program would help protect coastal waters.



Frans Lanting

4

NRDC'S PLAN TO END COASTAL POLLUTION

We cannot repair the damage caused by coastal pollution overnight. However, we can take steps immediately to turn the tide on coastal pollution. With persistence, we can bring back our coastal waters to the point where they are safe for fishing swimming, and marine life.

Here is NRDC's program to battle coastal pollution. Some of these steps address short-term health threats and pollution concerns, while others are designed to restore and maintain the long-term health of our coastal waters. If all of these steps are started immediately, within five years we should see a reversal of the decline in coastal waters and, within another five years, significant restoration of our coastal waters.

It is noteworthy that several of these steps are included in coastal protection legislation pending in Congress. This legislation will pass only with strong expressions of public support.

Toxics

- Impose strict new nationwide pollution control requirements for industries that currently pollute coastal and inland waters, either directly or through public sewers. These rules should cover all industries and all dangerous pollutants, and should prohibit discharges altogether where technologies such as wastewater recycling are available.
- Require companies to find new ways of doing business without polluting by: producing factory goods using fewer toxic chemicals and making more efficient use of water and materials; reducing the quantity of material entering municipal waste landfills through packaging reduction and materials recycling.
- Prohibit new or increased coastal discharges of factory pollution that would cause or contribute to a violation of water quality standards.
- Institute a nationwide program to collect and safely dispose of household hazardous wastes.
- Enforce current laws and regulations designed to control toxic factory pollution.

Sewage

- Eliminate all discharges of raw sewage from combined sewer overflows.
- Upgrade all existing coastal sewage plants to at least the degree required for inland waters (secondary treatment) or even stricter levels where needed to solve local water quality problems.
- Prohibit new or increased coastal discharges of pollution from sewage plants that would cause or contribute to a violation of water quality standards.
- Strengthen pretreatment programs to reduce the discharge of toxic pollutants into sewage treatment plants.
- End ocean dumping of sewage sludge and utilize environmentally acceptable land-based alternatives.

- Promote the use of water conservation devices in industry and the home in order to reduce the flow to sewage treatment plants and hence the danger of overflow.

Coastal Development

- Develop programs to pull back from the water's edge by:

— requiring land use plans, zoning ordinances, and coastal zone management plans to protect water quality and to limit the density of coastal development;

— requiring filter strips and buffer zones between new developments and coastal water bodies, including rivers and estuaries;

— increasing public purchases of sensitive coastal lands;

— eliminating subsidies and tax incentives that encourage coastal development, and replace them with tax and other incentives to preserve coastal habitat; and

— avoiding any development in coastal wetlands.

Poison Runoff

- Require strict, enforceable plans to reduce poison runoff from existing development and prevent poison runoff from new development. Comprehensive plans to control polluted urban runoff (stormwater) should be developed for all coastal counties. Farmers, developers, and other land users who cause poison runoff should be required to use buffer strips, runoff controls, integrated pest management, and other practices designed to prevent poison runoff.

Oil Spills

- Institute a comprehensive national program to protect coastal waters from oil spills by:

— aggressively pursuing a new national energy policy based on energy efficiency and renewable energy resources, to reduce our dependence on oil;

— keeping sensitive offshore and nearshore areas, such as Bristol Bay in Alaska, portions of the Pacific and Mid-Atlantic Coasts, the Florida Keys, and Georges Bank off Massachusetts, closed to oil development;

— passing laws that require those responsible for oil spills to pay the full costs of cleanup and restoration, and full damages to all injured parties, including damages for lost public resources;

— preventing oil spills through improved tanker design and construction, and improved navigation and licensing requirements for tanker operation;

— improving oil spill cleanup capabilities through improved planning, increased personnel training, more and better cleanup equipment, and dramatically increased research and development of cleanup technologies; and

— routing tankers as far as possible from sensitive coastal areas.

Medical Waste

- Stop all ocean dumping of medical waste, both directly and through public sewers.
- Adopt a nationwide tracking program to ensure that medical waste is safely disposed of.

Plastics

- Prevent the discharge of plastics from vessels, sewers, and other sources.
- Reduce the utilization of disposable plastics.

Dredged Spoils

- Prohibit ocean disposal of hazardous dredged spoils.
- Implement new programs to reduce the toxicity of dredged spoils.

Long-term Protection

- Protect sensitive marine areas as ocean sanctuaries.
- Adopt strict, new water quality standards that are designed to protect coastal habitats, fish, shellfish, and wildlife. Supplement these with standards which set pollutant limits in sediments, fish, and wildlife. Require that these new standards are met by all coastal dischargers and developers.
- Designate currently clean waters for special protection to make sure they stay clean.

5 WHAT YOU CAN DO TO STOP POLLUTION

Left: Planting American beach grass can help stabilize sand dunes and prevent erosion.
Photo by Richard N. Duncan / USDA-Soil Conservation Service

Steps You Can Take at Home

1. Use phosphate-free, low phosphate or biodegradable dishwashing liquid, laundry detergent, and shampoo.

   Algal growth is stimulated in phosphate-rich water. The result is eutrophication. For many water organisms this has devastating side effects. Fish and other animals suffocate because of the lack of oxygen.

2. Use natural fertilizers such as manure or compost on your garden. Landscape with natural vegetation rather than lawns that require fertilizers and pesticides.

   Through poison runoff, herbicides and pesticides eventually reach water where they can kill aquatic life.

3. Dispose of household hazardous and medical wastes properly. Do not pour paint, turpentine, petroleum-based oils, or solvents down any drain. Do not flush hypodermic needles down the toilet.

   These chemicals poison all water life. If you purchase them, read the label. Know what you are buying and what the potential hazards are. Use alternative, less harmful products whenever possible.

   Pour liquids such as cleaning fluids into a plastic container that is filled with kitty litter and allow it to dry outdoors before taking it to the landfill. Recycle old motor oil and antifreeze at a gas station that has an oil recycling program.

   Encourage your local Department of Health to organize a Household Toxics Collection Day on which hazardous wastes will be taken to a specialized dump site.

4. Do not use water fresheners in your toilet.

   Water fresheners are synthetic perfumes and colors. These poison the sewage treatment process.

5. Maintain your septic system so it will function properly and not contribute to groundwater contamination.

   Nearly 24 percent of all homes in the U.S. are served by septic systems. By following proper maintenance practices, you can keep your system running smoothly for years. Monitor your tank yearly and have a reputable contractor remove sludge and scum every three to five years in order to prevent solids from escaping the absorption system.

6. Improve the drainage around your home and in your yard.

   Improving drainage can help reduce surface runoff, prevent erosion, and protect coastal waters. Rainwater runs downhill, some filtering through the soil, some running directly into nearby streams. By designing your homesite correctly, you can encourage rainwater to move slowly across the soil so most of it filters into the ground. Install gravel trenches along driveways or patios to allow water from your drain spouts to seep into the soil slowly. This will collect water and allow it to filter into the soil.

7. Landscape with permeable surfaces.

   Solid surfaces such as concrete do not absorb moisture and increase surface runoff and spreading poisons to drainage systems. Use crushed rocks, gravel, or bricks laid in sand, not mortar. Preserve the established trees in your yard. They help minimize the damage caused by surface runoff. Plant appropriate shrubs and trees for the soil in your yard. Don't select vegetation that needs lots of watering. This increases runoff. Don't overwater.

8. Set your house back from the water's edge.

   Sewage and runoff impacts are minimized by locating houses away from the water.

9. Avoid using and disposing of plastics and styrofoam. When you do use these products, recycle them.

10. Conserve water whenever and wherever possible.

    Install water-conserving fixtures at home such as low-flow toilets that use only one gallon of water when flushed, instead of the usual five or more gallons; faucets; aerators; and showerheads. Extra water overwhelms sewage treatment plants and contributes to overflows.

    Check for leaks. A dripping faucet can waste up to 20 gallons of water every day. A leaking toilet can waste 200 gallons a day.

    Run your dishwasher and washing machine only when you have full loads. Don't run water continuously when washing dishes in the sink or while shaving or brushing your teeth. Water your lawn and wash your car only when absolutely necessary. When you do wash your car, rinse quickly. Use a hose that is high pressure, low volume, and has a controllable nozzle.

11. Be a responsible boater. Discharge boat sewage into onshore sanitary facilities and not into coastal waters. Don't dump trash overboard.

Steps You Can Take as a Consumer

1. Boycott persistent polluters.

   Identify sources of pollution and exercise your power as a consumer by not buying products from irresponsible polluters. Inform them of your decision. Encourage others to do the same.

2. Buy organically grown produce.

   Nitrates, an important component of artificial fertilizer often used in large-scale agriculture, seep into groundwater and poison our drinking water supply. Nitrates impair circulation to the brain and are a cancer risk. Moreover, pesticides and herbicides may cause cancer and birth defects. Tell your grocer of your preference. Encourage the store to stock organic produce.

3. Demand to know where the fish you buy is from and avoid fish caught in polluted coastal areas. Tell your grocer of your decision.

4. Do not buy or use anti-fouling marine paints that contain organotins.

5. Avoid using nonbiodegradable plastic bags at home and at the supermarket. Ask the store manager to supply paper bags or bags made of biodegradable plastic.

6. Buy fuel-efficient cars, weatherize your home, and improve the efficiency of your furnace or water-heater.

   The less oil that is used, the less pressure there will be to drill for oil in sensitive coastal areas such as Bristol Bay, the California Coast, Georges Bank, the Florida Keys, Washington, Oregon, and the Mid-Atlantic. This will also lessen the need to transport oil via tanker, thereby reducing the likelihood of oil spills such as the *Exxon Valdez*.

Land Use Activists

Citizen groups around the country are taking a more active role in lobbying for tighter coastal development laws. In California's Monterey County, for example, citizen action was instrumental in an effective campaign to limit construction in sensitive resource areas along the rugged Big Sur coast. The activists based their arguments for protection of coastal resource areas on the need to maintain the valuable habitats they provide. Local officials responded to the public's demand by establishing density standards of one unit for every 40 to 320 acres, depending on the steepness of the site's slope. The plan puts all wetlands, lagoons, indigenous dune plant habitats, and nearshore reefs, off limits to development.

Monterey County is not the only California area where local plans call for low-density coastal development. In the rural areas of Santa Barbara, San Luis Obispo, San Mateo, Marin, Sonoma, and Mendocino counties, the density for nearshore development ranges from one unit per five acres to one unit per 640 acres, with an average of one unit per 20 to 40 acres.

Chris Caswell

Steps You Can Take as a Citizen

1. Join a civic organization, coastal advocacy group, or other community group that is involved in efforts to preserve and restore the coast. If none exists, form one and encourage others to join.

2. Let your elected officials know how you and your community feel about the quality of life around the coast.

   Inform them of your concerns about the devastating effects of industrial and governmental indifference to coastal water pollution and ask them to take aggressive action to reverse these effects. Let your congressional representatives know of your interest in coastal protection legislation currently pending in Congress.

3. Adopt your local waterbody.

   Get to know the water you seek to protect either as an individual or as a member of a group. Find out the water quality by contacting the local Water Quality Control Board or EPA. Walk its banks, identify the sources of pollution, and push for tighter controls. If your waterbody's quality is not governed by a plan, contact your elected officials and get their help in supporting preparation of one. If there is a plan in place, monitor whether or not dischargers are in compliance with it. Lobby and litigate for compliance. Start in on cleanup and restoration.

4. Support strong land use planning.

   Lobby your local government or state coastal management agency to adopt land use planning policies that reduce the amount of development allowed along the coast and along streams and wetlands. Support measures that require developers to leave a percentage of mature trees standing when excavating for new developments.

   Land use controls can also help limit coastal pollution by directing development away from hillsides and areas prone to erosion in coastal watersheds. Construction activities disturb topsoil and produce runoff that results in increased sediment loads in coastal streams. These increased loads lead to rapid sedimentation in lagoons and wetlands.

Whistle-blowers of the Waterways

Citizens living near San Francisco Bay, the Long Island Sound, and the Hudson River have formed organizations as formal watchdog systems to protect their local waterways. The groups rely on individual volunteers and sometimes even paid staff to patrol the adopted waterways, report polluters, organize citizen support for strict pollution laws, and generally highlight the need for vigilance to keep the coastal waters healthy and clean. The Hudson River Keeper organization, for example, began by literally walking the river's banks and recording all outfalls into the river. Then, members checked with the state water agency and EPA to determine if the pollution sources were legally permitted. They reported those that weren't and supported tighter restrictions on those that were.

Frans Lanting

Where to Write

Express your concern about the decline of our coastal waters. Write to your elected officials or appropriate agency and ask that something be done now to end coastal pollution and make our coastal waters safe again for swimming, fishing, and marine life.

President George Bush
1600 Pennsylvania Ave., NW
Washington, DC 20500

U.S. House of Representatives:

House Merchant Marine and Fisheries Committee
1334 LHOB
Washington, DC 20515

House Public Works and Transportation Committee
2165 RHOB
Washington, DC 20515

House Interior and Insular Affairs Committee
1324 LHOB
Washington, DC 20515

U.S. Senate:

Senate Environment and Public Works Committee
SD-458
Washington, DC 20510

Senate Commerce, Science, and
Transportation Committee
SD-508
Washington, DC 20510

Federal Agencies:

Administrator
National Oceanic and Atmospheric Administration
National Ocean Service
Washington, DC 20235

William Reilly
Administrator
Environmental Protection Agency
401 M St.
Washington, DC 20460

ADDITIONS TO THE RECORD

American Paper Institute
ENVIRONMENTAL & HEALTH PROGRAM
National Forest Products Association

1250 Connecticut Avenue, N.W. • Suite 210 • Washington, D.C. 20036

Michael C. Farrar
Vice President
202-463-2580

May 22, 1990

Honorable Henry J. Nowak
Chairman
Water Resources Subcommittee
House Public Works and Transportation Committee
2165 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

The American Paper Institute (API) and the National Forest Products Association (NFPA) would like to submit the following comments for the hearing record with regard to the coastal pollution hearings held by your Subcommittee on May 9 and 10, 1990.

API and NFPA are the national trade associations of the pulp, paper and forest products industry. API represents more than 90 percent of the pulp and paper industry's production capacity in the United States. NFPA is the national association which represents the interests and views of owners and managers of forest lands, manufacturers of forest products, and affiliated regional and product associations. Membership includes over 500 direct, associated, and allied members in every state.

API and NFPA gave considerable attention to following the hearings, and we share your interest in improving water quality and assuring adequate protection of the coastal zone. But we have serious concerns about the scope and magnitude of H.R. 4323, the Great Lakes Water Quality Improvement Act (GLWQIA); H.R. 2647, the Coastal Defense Initiative (CDI); and H.R. 4030, the Coastal Zone Reauthorization Amendment of 1990.

Because of these concerns, which are detailed in this letter, we are strongly opposed to passage of these bills in their current form. They would interfere with the implementation of existing statutory authority under the Clean Water Act and will overlap with and confound ongoing efforts by the Environmental Protection Agency (EPA).

In our judgement, the Clean Water Act Amendments of 1987 already provide a solid framework for addressing Great Lakes water quality improvement; the development of water quality criteria and standards for coastal marine waters; and point and nonpoint source pollution. The CWA is designed to address both freshwater and coastal marine waters. It is entirely appropriate that the existing law should be the primary vehicle used to provide marine water protection.

H.R. 4323, would, however, significantly change the federal/state relationship that has evolved through the years in the implementation of the CWA. Any such action should be taken only after careful reflection on the ramifications of such a change to the entire CWA statute. To consider such changes in conjunction with the other pending bills, the Coastal Defense Initiative, and/or the Coastal Zone Act Reauthorization, would only further restructure the Clean Water Act.

Therefore, API and NFPA urge that no final action be taken by the Subcommittee on H.R. 4323, H.R. 2647, or H.R. 4030 in this session of Congress. Instead, we suggest that the Subcommittee continue its in-depth review of the issue, and address any coastal pollution issues during the comprehensive review of the Clean Water Act in the 102nd Congress. This would insure that any major new element to the Act would be developed in the context of, and in harmony with, the remainder of the statute.

IMPACTS OF H.R. 4323 ON ONGOING WATER QUALITY CRITERIA AND STANDARDS PROGRAM NEED CAREFUL EVALUATION

Under the Clean Water Act, an extensive program to develop water quality criteria is already established. That ongoing program is applicable not only to freshwater but to coastal marine waters as well. In that regard, EPA is presently reviewing the status of state water quality criteria and standards, and EPA has announced that in June 1991, it will propose national standards applicable to those states that have not already adopted their own. As you heard in testimony from Robert Wayland, Deputy Assistant Administrator of Water at the Environmental Protection Agency, significant progress has been made in setting water quality criteria and standards as mandated under the existing Clean Water Act Amendments of 1987.

Mr. Wayland's testimony also indicated that development of salt water criteria is a long, complex undertaking. Consequently, we believe the deadlines imposed in the Coastal Defense Initiative and the Great Lakes Water Quality Improvement Act set unreasonable time frames. One of EPA's highest FY 1991 water program priorities is to encourage and work with the States to extend water quality standards to coastal areas. Existing regulatory authority is available for EPA to address coastal marine problems through the National Estuarine Program and the Near Coastal Waters Program.

Section 303(c) of the Clean Water Act provides detailed guidelines to the states for establishing water quality standards. Further, EPA is scheduled to propose national numeric water quality criteria for toxic pollutants that will become part of the water quality standards of states that have failed to comply with Section 303(c) of the CWA. State discretion to establish water quality standards within the confines of tight federal guidance is a key aspect of the Clean Water Act combining the strengths of both federal and state governments. We believe that altering the present system will adversely affect the progress achieved up to this point.

As a case in point, Valdas Adamkus, Region V Administrator of the EPA, stated that the Agency hopes to have Great Lakes specific guidance -- including water quality criteria for human health, aquatic life and wildlife -- ready for the eight Great Lakes states to use in reviewing and revising their water quality standards in 1993.

GRAFTING A CWA AMENDMENT ONTO THE COASTAL DEFENSE INITIATIVE WILL ONLY COMPOUND THE COMPLEXITIES OF IMPLEMENTING A WATER QUALITY PROGRAM

API/NFPA sent a letter on April 3, 1990 to members of the House Subcommittees on Fisheries and Wildlife Conservation and the Environment and on Oceanography and the Great Lakes. At that time, we expressed deep reservation and concern about the overlapping and conflicting provisions of H.R. 2647 legislation and its interference with the implementation of existing statutory authority under the Clean Water Act. Such significant changes to the existing provisions of the Clean Water Act would upset current activities at the federal and state levels.

The Coastal Defense Initiative legislation could interfere with and significantly change the orderly development of regulatory programs developed by the Environmental Protection Agency. For example, the Clean Water Act, as amended in 1987, authorized two new programs: the Section 319 Nonpoint Source Program, and the Section 304(l) Individual Control Strategies (so called "toxic hot-spots"). These two programs are applicable to all waters of the United States, including coastal areas. Consequently, we question the wisdom and necessity of establishing in HR 2647 additional authority and requirements for point and non-point source programs, when recently enacted legislation -- only now beginning to have its impact felt -- already addresses these concerns.

OTHER PROVISIONS OF CONCERN IN H.R. 2647

Other provisions in H.R. 2647 that concern this industry are the National Coastal Effluent Fee (Section 604), the Environmental Audit (Section 505) and the Coast Water Quality Program (Section 203).

The funding provisions contained in Section 604 would establish a National Coastal Effluent Fee. This is inappropriate since the primary enabling legislation governing this entire subject, the Clean Water Act, does not address discharge fees or economic incentives to reduce discharges. We understand a number of other fee proposals are being discussed for the water programs. Before major changes that would so drastically expand the Clean Water Act are considered in a piecemeal fashion, we would urge that additional public hearings be conducted so that all the ramifications of those changes can be fully explored.

Section 505 would require significant major dischargers into coastal waters to prepare an environmental audit (prepared by an EPA-approved auditor) certifying that a facility is in compliance with all requirements of the Clean Water Act. We believe this is inappropriate as NPDES permits now require public notice and comment; EPA already has monitoring and compliance data; and many companies already conduct voluntary auditing programs.

Section 203 would amend Section 304(n) of the Clean Water Act to require states to develop comprehensive coastal water quality programs that implement an enforceable system for allocating and exchanging discharge credits and pollution offsets among point sources, and between point and nonpoint sources, of coastal waters pollution. This provision presumes the ability to quantify and measure loadings from nonpoint sources. The ability to analytically measure pollutant loadings from different land use activities, and to distinguish them from naturally occurring events, involves an extremely inexact science. This provision will provide a windfall for consultants, not a benefit for water quality.

COMMITTEE URGED TO CONTINUE TO SEEK SEQUENTIAL REFERRAL ON H.R. 4030

API and NFPA also urge that the House Public Works and Transportation Committee continue to seek sequential jurisdiction over the Coastal Zone Act Reauthorization Amendments of 1990 (H.R. 4030). This bill contains provisions regarding wetlands, and other provisions affecting state establishment of criteria and standards, that are plainly Clean Water Act issues and, therefore, within the purview of the Committee. As noted previously, we believe these issues should more appropriately be considered in the context of a comprehensive review of the Clean Water Act.

Additional legislation imposing a series of unduly optimistic statutory deadlines would be neither necessary nor helpful to efforts to improve water quality at this time. The Environmental Protection Agency has sufficient authority in the Clean Water Act and the Marine Protection, Research and Sanctuaries Act to implement the necessary water quality initiatives. New legislation, further blurring the areas of jurisdiction between these statutes, will only lead to further confusion and delay.

API and NFPA appreciate the opportunity to submit these comments. We look forward to working with the Subcommittee in developing responsible legislation, designed to ensure continued environmental improvement, without imposing unduly restrictive economic restraints on our society.

Very truly yours,

Michael C. Farrar

TESTIMONY
U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
COASTAL POLLUTION ISSUES

THE FOLLOWING IS TESTIMONY FROM THE CALIFORNIA STATE WATER RESOURCES CONTROL BOARD. WE HOPE TO ACCOMPLISH THREE THINGS IN OUR TESTIMONY TODAY. FIRST A BRIEF OVERVIEW OF THE STATE OF CALIFORNIA'S WATER QUALITY PROGRAMS. SECONDLY, TO ADDRESS HOW COASTAL POLLUTION RELATES TO OUR TOTAL WATER QUALITY PROGRAMS AND WHETHER IT SHOULD EVEN BE GIVEN ANY SPECIAL TREATMENT AT THE NATIONAL LEVEL. LASTLY, TO SHARE WITH YOU OUR CONCERN THAT SOME FEATURES OF PROPOSED FEDERAL LEGISLATION THAT WE HAVE SEEN MAY HAVE THE POTENTIAL OF UNNECESSARILY CONFUSING CALIFORNIA'S DIVISIONS OF RESPONSIBILITY BETWEEN WATER QUALITY CONTROL ACTIVITIES AND COASTAL LAND USE ACTIVITIES.

IN CALIFORNIA THE STATE WATER BOARD ALONG WITH NINE REGIONAL WATER QUALITY CONTROL BOARDS, ARE THE PRINCIPLE STATE AGENCIES WITH PRIMARY RESPONSIBILITY FOR THE COORDINATION AND CONTROL OF WATER QUALITY. THE STATE WATER BOARD EXERCISES ITS WATER QUALITY AUTHORITY UNDER A COMPREHENSIVE STATE STATUTORY SCHEME KNOWN AS THE PORTER-COLOGNE WATER QUALITY CONTROL ACT. WHEN ENACTED IN 1969, THIS ACT WAS CALLED THE MOST FAR REACHING WATER QUALITY ACT IN THE NATION. WE IN CALIFORNIA LIKE TO THINK THAT IT STILL IS. MUCH OF THE FEDERAL CLEAN WATER ACT IS PATTERNED AFTER THIS STATE LAW. AN EXAMPLE IS THE CLEAN WATER ACT'S PERMITTING PROGRAM, THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM OR NPDES. IN 1973 CALIFORNIA BECAME THE FIRST STATE IN THE NATION AUTHORIZED TO ADMINISTER THE NPDES PROGRAM. THE CALIFORNIA STATE WATER BOARD IS DESIGNATED AS THE STATE WATER POLLUTION CONTROL AGENCY FOR ALL PURPOSES STATED IN THE CLEAN WATER ACT.

THE STATE AND REGIONAL WATER BOARDS MAJOR WATER QUALITY PROGRAMS INCLUDE PLANNING, PERMITTING, MONITORING AND ENFORCEMENT. UNDER PLANNING WE ADOPT WATER QUALITY

CONTROL PLANS FOR ALL WATERS OF THE STATE, INCLUDING OCEAN WATERS. THESE PLANS ESTABLISH BENEFICIAL USES TO BE PROTECTED, NUMERICAL AND NARRATIVE WATER QUALITY STANDARDS AND IMPLEMENTATION PLANS.

THESE WATER QUALITY CONTROL PLANS ARE IMPLEMENTED THROUGH PERMITS WHICH ARE CALLED WASTE DISCHARGE REQUIREMENTS. NPDES PERMITS REQUIRED BY THE CLEAN WATER ACT ARE COVERED BY THIS PROGRAM AS WELL AS ANY OTHER DISCHARGES THAT MAY AFFECT WATER QUALITY.

THE CALIFORNIA STATE AND REGIONAL WATER BOARDS OVERSEE A VAST MONITORING NETWORK. THIS MONITORING INCLUDES NOT ONLY OUR OWN BASELINE AND TREND MONITORING PROGRAMS BUT ALSO MONITORING PERFORMED BY INDIVIDUAL DISCHARGERS.

FINALLY, WE CARRY OUT A COMPREHENSIVE ENFORCEMENT PROGRAM WHICH INCLUDES THE ABILITY TO ISSUE CEASE AND DESIST ORDERS, CLEANUP AND ABATEMENT ORDERS AND ADMINISTRATIVE CIVIL LIABILITY. THE LATTER POWER, THE ABILITY TO ASSESS FINES AT THE ADMINISTRATIVE LEVEL, WAS ESTABLISHED IN 1984. AS SUCH CALIFORNIA BECAME ONE OF THE FIRST PLACES WHERE FINES COULD BE ASSESSED AGAINST POLLUTERS WITHOUT THE NEED TO INVOLVE THE MACHINERY OF THE COURTS.

WITH THIS OVERVIEW IN MIND, WE WOULD NOW LIKE TO ADDRESS THE ISSUE OF WHETHER COASTAL POLLUTION SHOULD BE GIVEN SPECIAL ATTENTION AT THE NATIONAL LEVEL AT ALL. WE UNDERSTAND THAT CONGRESS HAS BEEN LOOKING AT SEVERAL MEASURES THAT WOULD SPECIFICALLY ADDRESS COASTAL POLLUTION ISSUES. SOME OF THESE MEASURES ARE MORE COMPREHENSIVE THAN OTHERS. ONE CONCERN WE HAVE AS THE AGENCY THAT RUNS CALIFORNIA'S WATER QUALITY PROGRAMS IS THE WISDOM OF ELEVATING COASTAL WATER POLLUTION TO A SEPARATE STATUS WITH ITS OWN SPECIFIC LAWS AND REQUIREMENTS.

CALIFORNIA'S WATER QUALITY LAWS APPLY ACROSS-THE-BOARD TO ALL DISCHARGERS OF WASTE THAT MAY AFFECT WATER QUALITY. THIS PROGRAM COVERS BOTH POINT AND NONPOINT SOURCES OF POLLUTION. IT COVERS DISCHARGES TO MARINE WATERS, INLAND SURFACE WATERS AND TO CALIFORNIA'S VAST SUPPLIES OF GROUND WATER. SINCE THE STATE LAW IS WRITTEN GENERALLY, THE WATER QUALITY EXPERTS AT THE AGENCY LEVEL HAVE BEEN ABLE TO TAILOR WATER QUALITY PROGRAMS FLEXIBLY TO ADDRESS THE PRIORITY CONCERNS. THESE PRIORITIES HAVE CHANGED OVER TIME. FOR EXAMPLE INCREASING EMPHASIS HAS BEEN GIVEN TO TOXIC POLLUTANTS AS CONVENTIONAL POLLUTANTS HAVE BEEN ADDRESSED. NONPOINT SOURCES OF POLLUTION ARE RECEIVING INCREASED ATTENTION.

WE QUESTION WHETHER IT IS APPROPRIATE, AT THE NATIONAL LEVEL, TO CREATE NEW PROGRAMS THAT DEAL SPECIFICALLY AND COMPREHENSIVELY WITH COASTAL POLLUTION. THE COASTAL PROBLEMS OF THE EAST COAST ARE VERY DIFFERENT FROM THOSE ON THE WEST COAST. EXAMPLES OF DIFFERENCES INCLUDE THE MUCH GREATER NUMBER OF COMBINED STORMWATER SEWER SYSTEMS ON THE EAST COAST, THE DIFFERENCES IN MIXING ZONE POTENTIAL AND THE OFFSHORE OIL ISSUE. WE AT THE CALIFORNIA STATE WATER BOARD WOULD PREFER TO ESTABLISH OUR OWN WATER QUALITY PRIORITIES AND CLEAN WATER STRATEGIES WITHIN THE EXISTING GENERAL FRAMEWORK RATHER THAN HAVING TO ADJUST TO A NATIONAL PROGRAM THAT DEALS WITH A SPECIFIC SUBSET OF THE OVERALL POLLUTION PROBLEM.

ANOTHER CONCERN WE HAVE WITH A NATIONAL COASTAL POLLUTION PROGRAM IS THE IMPACT IT MIGHT HAVE ON CALIFORNIA'S AND OTHER WESTERN STATES WATER SUPPLY ISSUES. IN ADDITION TO ADMINISTERING CALIFORNIA'S WATER QUALITY PROGRAM, THE STATE WATER BOARD ALLOCATES RIGHTS TO THE USE OF SURFACE WATER AND ACTS TO PREVENT THE WASTE OR UNREASONABLE USE OF WATER. WE MUST BE CAREFUL THAT WATER QUALITY PROGRAMS

DON'T HAVE UNINTENDED IMPACTS ON WATER SUPPLIES. FOR EXAMPLE, IN THE ARID WEST, USE OF RECLAIMED WATER IS ESSENTIAL. REQUIREMENTS AT THE NATIONAL LEVEL OF STRINGENT WATER QUALITY STANDARDS MAY UNNECESSARILY IMPEDE RECLAMATION EFFORTS.

NEXT WE WOULD LIKE TO ADDRESS THE ISSUE OF POTENTIAL OVERLAP AND DUPLICATION BETWEEN WATER QUALITY AND COASTAL MANAGEMENT ACTIVITIES.

CALIFORNIA'S LONG-STANDING COMPREHENSIVE WATER QUALITY PROGRAMS LARGELY PREDATED CALIFORNIA'S EFFORTS IN THE COASTAL ZONE MANAGEMENT AREA. AS CALIFORNIA BEGAN DEVELOPING SUCH COASTAL MANAGEMENT PROGRAMS IN THE 1970'S THE STATE AND REGIONAL WATER BOARDS BECAME CONCERNED THAT COASTAL MANAGEMENT SHOULD COMPLIMENT RATHER THAN DUPLICATE OR CONFUSE EXISTING WATER QUALITY PROGRAMS. THUS WE WORKED WITH THE CALIFORNIA STATE LEGISLATURE TO DEFINE A DIVISION OF RESPONSIBILITY BETWEEN LAND USE PLANNING ALONG CALIFORNIA'S COAST AND THE REGULATION OF ACTIVITIES THAT AFFECT COASTAL WATER QUALITY. IN CALIFORNIA THIS DIVISION OF RESPONSIBILITY IS SPELLED OUT IN THE STATE'S COASTAL ACT WHICH IS ADMINISTERED BY THE CALIFORNIA STATE COASTAL COMMISSION, ANOTHER STATE AGENCY. UNDER THE COASTAL ACT, NO ACTION OF THE COASTAL COMMISSION MAY BE TAKEN IN CONFLICT WITH ANY DETERMINATION BY THE STATE OR REGIONAL WATER BOARDS RELATING TO WATER QUALITY. OVER THE YEARS THERE HAS BEEN A MINIMUM OF DUPLICATION OR OVERLAP IN THE ACTIVITIES OF THE TWO AGENCIES.

TO SUM UP, CALIFORNIA'S WATER QUALITY PROGRAMS HAVE WORKED WELL AND THERE HAS BEEN A MINIMUM OF OVERLAP OR DUPLICATION WITH COASTAL ZONE MANAGEMENT ACTIVITIES. IT IS THIS POTENTIAL FOR DUPLICATION AND OVERLAP WHICH MOST CONCERNS US ABOUT SUCH BILLS AS HR 2647. HR 2647 WOULD ENACT A NEW SECTION 306B OF THE COASTAL ZONE

MANAGEMENT ACT. SECTION 306B WOULD REQUIRE THE COASTAL ZONE MANAGEMENT AGENCY -- IN CALIFORNIA THE COASTAL COMMISSION -- TO PREPARE A COASTAL WATER QUALITY PROTECTION PROGRAM. THE PURPOSE OF THE PROGRAM IS TO DEVELOP AND IMPLEMENT POLLUTION CONTROL MEASURES FOR LAND-BASED SOURCES OF NONPOINT SOURCE POLLUTION. WHILE HR 2647 PROVIDES THAT THE COASTAL ZONE MANAGEMENT AGENCY SHALL COORDINATE WITH OTHER STATE AUTHORITIES IN DEVELOPING AND CARRYING OUT THIS PROGRAM, IT APPEARS THAT SECTION 306B WILL DUPLICATE AND OVERLAP EXISTING STATE WATER BOARD AUTHORITIES. THE BILL INDICATES THAT THE PROGRAM MAY INCLUDE SUCH "LAND USE MANAGEMENT MEASURES" AS STORMWATER MANAGEMENT, SEWAGE DISPOSAL PRACTICES, SOIL EROSION AND SEDIMENT CONTROL. THESE ARE PRACTICES WHICH HAVE BEEN REGULATED BY THE STATE AND REGIONAL WATER BOARDS AS CALIFORNIA'S WATER POLLUTION CONTROL AGENCIES. THIS BILL WOULD AUTHORIZE THE COASTAL COMMISSION TO ENGAGE IN WATER QUALITY REGULATORY ACTIVITIES. WE SIMPLY DON'T NEED ANOTHER WATER QUALITY AGENCY IN THE COASTAL ZONE.

AMENDMENTS MADE TO THE CLEAN WATER ACT IN 1987 REQUIRE STATE POLLUTION CONTROL AGENCIES TO DO MANY OF THE THINGS THAT WOULD BE PART OF THE COASTAL WATER QUALITY PROTECTION PROGRAM ENVISIONED BY HR 2647. FOR EXAMPLE SECTION 319 OF THE CLEAN WATER ACT REQUIRES THE DEVELOPMENT OF A NONPOINT SOURCE MANAGEMENT PLAN. THE STATE WATER BOARD ADOPTED SUCH A PLAN IN NOVEMBER OF 1988. SECTION 405 OF THE CLEAN WATER ACT CONTAINS NEW PROVISIONS REGARDING THE DISPOSAL OF SEWAGE SLUDGE. SECTION 402 WAS AMENDED TO INCLUDE MORE COMPREHENSIVE REGULATION OF MUNICIPAL AND INDUSTRIAL STORMWATER DISCHARGES. THUS MANY OF THE KEY ELEMENTS OF THE PROPOSED COASTAL WATER QUALITY PROTECTION PROGRAM ARE ALREADY BEING ADDRESSED BY THE STATE POLLUTION CONTROL AGENCIES. INSERTION OF THE COASTAL ZONE MANAGEMENT AGENCIES INTO THESE AREAS DOES NOT MAKE A LOT OF SENSE IN CALIFORNIA.

NEW STATE PROGRAMS ARE ALSO ALREADY ADDRESSING AREAS THAT WOULD BE DUPLICATED BY THE COASTAL WATER QUALITY PROTECTION PROGRAM. LAST YEAR THE CALIFORNIA STATE LEGISLATURE ENACTED A NEW BAYS AND ESTUARIES PROGRAM. AMONG OTHER THINGS, THIS PROGRAM CALLS FOR THE DEVELOPMENT OF SEDIMENT WATER QUALITY STANDARDS AND REGULATIONS TO CONTROL SOURCE POLLUTANTS. ADDITIONALLY, THROUGH OUR STATE'S UNIQUE INITIATIVE PROCESS CALIFORNIA VOTERS WILL BE ASKED IN THE NOVEMBER 1990 GENERAL ELECTION WHETHER TO ENACT WHAT HAS BEEN OFFICIALLY NAMED THE ENVIRONMENTAL PROTECTION ACT OF 1990. THIS FAR-REACHING ENVIRONMENTAL INITIATIVE IS MORE COMMONLY KNOWN AS "BIG-GREEN". THE EARLY POLLS INDICATE THAT THE INITIATIVE WILL LIKELY BECOME STATE LAW. AMONG ITS MANY FEATURES, BIG-GREEN WOULD ADD A CHAPTER TO THE CALIFORNIA WATER CODE SPECIFICALLY DEALING WITH OCEAN WATER QUALITY. INCLUDED IN THIS CHAPTER ARE PROVISIONS DEALING WITH OCEAN WATER QUALITY CRITERIA, SEDIMENT QUALITY STANDARDS, STATEWIDE OCEAN WATER QUALITY MONITORING, STORMWATER MANAGEMENT CONTROL PLANS AND POLLUTION CONTROL AUDITS. SUFFICE IT TO SAY, THESE NEW PROGRAMS IN MANY RESPECTS GO FAR BEYOND WHAT WOULD BE REQUIRED UNDER HR 2647'S COASTAL WATER QUALITY PROTECTION PROGRAM.

THUS OUR MAJOR CONCERN WITH HR 2647 IS THE ESTABLISHMENT OF A DUPLICATIVE PROGRAM ADMINISTERED BY ANOTHER STATE AGENCY. WE HAVE HAD EXPERIENCE WITH SUCH DUPLICATION AND OVERLAP PROBLEMS IN CALIFORNIA AND IT IS NOT ALWAYS A PRETTY SIGHT. FOR EXAMPLE, BOTH THE CALIFORNIA STATE WATER BOARD AND THE CALIFORNIA STATE DEPARTMENT OF HEALTH SERVICES HAVE AUTHORITY TO OVERSEE THE CLEANUP OF HAZARDOUS WASTE SPILLS AND LEAKS. WHILE WE HAVE TRIED TO COORDINATE OUR ACTIVITIES, THERE HAVE BEEN EXAMPLES OF DIFFERENT CLEANUP STANDARDS BEING ADOPTED FOR THE SAME SITE AND ENSUING "TURF" BATTLES. SIMILAR COORDINATION PROBLEMS HAVE OCCURRED OVER THE REGULATION OF LANDFILLS BY THE STATE WATER BOARD AND YET ANOTHER

STATE AGENCY, THE CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD. UNFORTUNATELY WE SEE THE SAME TYPES OF PROBLEMS OCCURRING IN THE COASTAL ZONE BETWEEN THE STATE AND REGIONAL WATER BOARDS AND THE CALIFORNIA COASTAL COMMISSION IF THE LATTER AGENCY IS REQUIRED TO ADOPT A COASTAL WATER QUALITY PROTECTION PROGRAM. IN CALIFORNIA WE JUST DON'T NEED ANOTHER WATER QUALITY PLAYER. EXISTING LAWS ARE MORE THAN ADEQUATE.

WE WOULD PREFER TO SEE PROVISIONS LIKE SECTION 306B REMOVED. AT A MINIMUM SECTION 306B SHOULD BE AMENDED TO CLEARLY INDICATE THAT THE DEVELOPMENT AND IMPLEMENTATION OF COASTAL WATER QUALITY PROTECTION PROGRAMS SHALL NOT DUPLICATE OR BE IN CONFLICT WITH ANY PROGRAMS, PLANS, PERMITS, STANDARDS, CORRECTIVE ACTIONS OR OTHER DETERMINATION MADE BY STATE WATER POLLUTION CONTROL AGENCIES. WE WOULD BE HAPPY TO WORK WITH YOUR STAFF ON APPROPRIATE LANGUAGE.

FINALLY, THE STATE WATER BOARD HAS A CONCERN WITH THE MONITORING PROGRAMS SUCH AS THOSE THAT WOULD BE ESTABLISHED UNDER TITLE IV OF HR 2647. SUCH PROGRAMS ARE UNNECESSARY IN CALIFORNIA. WE ALREADY HAVE COMPREHENSIVE MONITORING AS REQUIRED BY BOTH THE CLEAN WATER ACT AND STATE LAW. BIG-GREEN WOULD REQUIRE EVEN MORE MONITORING.

THANK YOU FOR THE OPPORTUNITY OF MAKING THIS PRESENTATION.

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TESTIMONY OF

THE NATIONAL ASSOCIATION OF REGIONAL COUNCILS

FOR THE

SUBCOMMITTEE ON WATER RESOURCES

OF THE

PUBLIC WORKS AND TRANSPORTATION COMMITTEE

UNITED STATES HOUSE OF REPRESENTATIVES

April 4, 1990
Washington, D.C.

The National Association of Regional Councils represents a majority of the Nation's 530 substate regionals associations of government. Regional councils of government, which in some areas are called regional planning commissions, local development districts or associations of government, are agencies of local government under the direction of city and county elected officials. They fill a gap in our intergovernmental structure by dealing with problems, such as water quality, that transcend jurisdictional boundaries and must be addressed on a regional basis.

The basic responsibility of a regional council is to be an umbrella agency that facilitates regional coordination and management activities. Many regional councils also arrange for the implementation of regional policies and programs. Regional councils also allow rural local governments to more efficiently coordinate and deliver programs vital to rural areas.

In addition, many of the 530 regional councils are designated areawide water quality management planning agencies. These councils provide an important linkage between local governments and the states by performing planning, coordination, and public information activities leading to implementation of programs and policies to control the sources of water pollution and attain national water quality standards. It is this linkage that assures the direct involvement of local governments which are ultimately responsible for implementation of policies and regulations to control the sources of water pollution.

In 1981 Congress strengthened its commitment to areawide water quality management planning when it mandated in Section 205(j) a one percent set aside from wastewater construction grants for water quality management planning. Congress explicitly directed the states to give funding priority to designated public comprehensive planning organizations. In 1987, amendments to the Clean Water Act, Congress reaffirmed its commitment to areawide water quality management planning with a requirement that the states pass through at least forty percent of water quality management planning funds to areawide agencies.

Moreover, Congress wisely ensured that as the national program transitioned from a grants assistance program for wastewater treatment facility construction to a revolving loan program, the states would continue to comply with planning and regulatory requirements in the Federal Water Pollution Control Act as a prerequisite for the use of such funds. This is a condition precedent to the continued eligibility by states for revolving loan capitalization grants from EPA. We strongly endorse that policy; it will not only provide vitally needed planning funds, but most importantly, it will provide the opportunity for local governments to contribute to the attainment of water quality objectives.

We know that regional councils can make a substantial contribution to attaining the national objectives in the Clean Water Act. Moreover, third efforts have tangible results; it is not planning for planning's sake. At the end of this presentation, we have set forth representative sample of the type of these water quality management planning activities.

Our current concern is over the continuation of the 205(j) program. We believe that the Water Quality Act of 1987 clearly requires each state that receives a capitalization grant set aside a part of such grant for 205 planning purposes. Apparently, this view is not shared with many state agencies that administer the revolving loan program. Some of our members understand that their state believe that the 205(j) planning program and its set aside requirement will no longer apply when the construction grant program is fully converted to capitalization grants in FY91. And this interpretation is a cause for alarm by our regional councils.

NARC believes this matter can be easily reconciled. We understand that the committee proposes legislation to amend the Act to establish new apportionment factors for the delivery of capitalization grant funds to the states. At that time, we urge you to clearly restate that Section 205(j) planning, including the 40% pass through provision, shall be maintained out of set asides from the annual federal capitalization grants for state revolving funds.

To evidence the contribution such planning funds can have on attaining national water quality objectives, we have listed some examples of the activities undertaken with 205(j) funding. Further, such activities are being undertaken with minimal federal investment, and have a large pay-off in terms of contributing to meeting the goals of the Federal Water Pollution Control Act. In many instances, regional councils have leveraged these funds to obtain substantial local and state funding beyond what is required to match the federal funds.

The Metropolitan Washington Council of Governments (MWCOG), Washington, D.C., was an early participant in water quality management planning funded under section 205(j) of the Water Quality Act. The planning and research activities funded under "205(j)" have provided the technical foundation for MWCOG's current water quality program which is now focused on implementation of water quality controls and ongoing monitoring to identify water quality trends and evaluate performance. While MWCOG's current program is supported for the most part with local funds, the current level of technical sophistication would not have been possible without the initial federal support under the 205(j) water quality management planning program.

An example of MWCOG's current activities is a project to restore the highly urbanized Anacostia watershed. This project builds upon MWCOG's successful program for controlling urban runoff. In 1988 state and local agencies signed a formal interjurisdictional agreement to comprehensively address the problems of the Anacostia watershed and to restore it to a clean, healthy, regional resource. MWCOG is providing the administrative and technical support for this effort. Under the agreement, the signatories will (1) earmark funds for the development and implementation of initiatives stated in restoration workplans; (2) implement local and regional programs and projects; and (3) annually evaluate and report the progress of the restoration effort.

During the first year much work was accomplished toward restoration of the watershed including an intensive baseline analysis of water quality conditions to provide a snapshot of the problems; the development of a mathematical model of the tidal Anacostia; the design, construction and implementation of a number of water quality control projects, most notably the construction of the infrastructure for a program to minimize combined sewer overflow; inventories to identify potential retrofit projects within the watershed; and an increase in the number and efficiency of sediment and urban runoff controls in the basin.

The Northern Virginia Planning District Commission (NVPDC), Annandale, Virginia, routinely performs technical reviews of urban Best Management Practice (BMP) plans during the design phase of development. In 1987, NVPDC conducted for jurisdictions within the Occoquon River Basin an analysis of regional BMPs looking at cost-effectiveness and developing siting and design criteria. This information provided local jurisdictions with the planning tools necessary to implement regional BMPs. Using local-only funding, NVPDC has also prepared a BMP handbook for the Occuoquon Watershed. The handbook contains detailed information on each type of BMP including step-by-step design procedures, factors to consider when designing a BMP facility, examples of existing facilities in the area, and detailed design aids. In addition, to improve practical design guidelines for use by engineers designing BMPs, NVPDC recently conducted a laboratory investigation of three areas associated with BMP performance to be able to better quantify expected pollutant removal rates.

The Northeast Ohio Areawide Coordinating Agency (NOACCA), Cleveland, Ohio, recently initiated a project to provide for increased implementation of nonpoint source pollution controls on land draining into a major lake within the region. The project involves the inventorying of ground conditions to enable the design and implementation of remedial measures, and the demonstration of an efficient and cost-effective process by which control needs can be quantified. NOACA recently undertook three projects to assist local communities in defining their groundwater management needs and to develop recommended programs to meet those needs. The projects included the development of a unified environmental data base management system, technical assistance in the development of a local groundwater management plan, and the development of a plan for enhanced public participation in local groundwater management programs. NOACA plans to launch similar efforts in watersheds throughout the five-county planning area.

In 1988, the Houston-Galveston Area Council (HGAC), Houston, Texas used 205(j) funding to support its participation with the Texas Water Commission in the preparation of the State Nonpoint Source Assessment and Management Reports. Under this project, HGAC identified and evaluated watersheds with potential nonpoint source-related water quality problems; identified activities and land uses that would generate nonpoint source pollution; identified specific pollutants known or suspected to contribute to water quality problems; and identified BMPs to control nonpoint source pollution and which were in place throughout the region. HGAC also developed recommendations for the control of nonpoint source pollution throughout the region, and recommended a framework for establishing watershed task forces to address nonpoint source pollution. Over the next year, HGAC will hold workshops on BMPs to develop model guidelines for use in any of its watersheds.

Federal 205(j) funding also supports HGAC's ongoing work in wasteload projections which is used by the state in water quality monitoring as well as by HGAC in their involvement in the Galveston Bay National Estuary Program and the Wellhead Protection Program.

The Southeastern Michigan Council of Governments (SEMCOG), Detroit, Michigan, using 205(j) funds prepared a remedial action plan for the Rouge River, one of the most polluted in the country. In preparing the plan, SEMCOG used advisory committees made up of the local units of government and other decisionmakers with a stake in the clean-up of the river. Because of the involvement of the local communities in the planning process, SEMCOG was able to gain the endorsement of the communities in the river basin and the endorsement of the Michigan Department of Natural Resources on a very highly controversial and expensive plan, The plan is now being utilized as the basis for NPDES permits aimed at implementing clean-up activities.

The Piedmont Triad Council of Governments (PTCOG), Greensboro, North Carolina, with the support of federal 205(j) funding has been actively involved in nonpoint source pollution control. During the past year, three activities are of particular note:

- PTCOG conducted indepth field surveys of all point and nonpoint sources in the watershed area encompassed by the council. Detailed inventories and maps were prepared for use by the council and local jurisdictions.
- PTCOG was able to secure the support of all local governments located in the watershed to enact watershed protection ordinances.
- PTCOG developed a model watershed protection ordinance for use by the local jurisdictions with urban and rural BMP guidelines for control of runoff, sedimentation, contamination and stormwater.

These are but a few examples of ways in which regional council water quality management planning programs and activities can make a valuable contribution toward preserving and enhancing the quality of our nation's water resources. We believe these kinds of activities need to be fostered and the role of regional councils preserved.

Some states are, in fact, fulfilling the statutory requirement for updating and maintaining 208 areawide water quality management plans plans and are complying with the mandatory pass through to regional councils of water quality management planning funds. In these cases, the states are taking full advantage of the potential contributions, such as those illustrated above, that regional councils can make. Nevertheless, we know that in most cases states are ignoring these requirements. Unfortunately, the Environmental Protection is not adequately monitoring state compliance with these planning and pass through requirements. Therefore, we have no way of knowing whether the states are diverting 205(j) planning funds without a finding, in consultation with local governments, that there are no activities that regional councils can undertake that would contribute to meeting the goals of the Act.

We strongly urge this Committee, in its oversight function, require the Environmental Protection Agency to fulfills it responsibility enforcing state compliance with requirements of the Act that call for a mandatory pass through of water quality management planning funds and for consistency with 208 areawide water quality management plans. This is of particular concern because we are at a vital juncture: states soon will be fully administering the EPA-supported Revolving Loan Program which also carries with it the requirements for consistency with 208 areawide water quality management plans and pass through of planning funds.

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